

PIC-6291

93-056-TIN-235,,

Contract No.: 500-92-0011(02)
MPR Reference No.: 8137-330

**COSTS AND CONSEQUENCES OF
CASE MANAGEMENT FOR
MEDICARE BENEFICIARIES**

FINAL REPORT

April 30, 1997

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Submitted to:

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ACKNOWLEDGMENTS

The authors would like to thank the Medicare Case Management Demonstration project directors and their staff for their efforts in designing and operating the projects, for sharing their implementation experiences, and for answering the authors' never-ending questions: Mary Jane Teirumniks and Monica Weber at AdminaStar Solutions, Karen Coburn at Iowa Foundation for Medical Care, and Larry Salwin at Providence Hospital. We also thank the Medicare beneficiaries who agreed to participate in the projects.

We received valuable assistance from a number of our colleagues at Mathematica. West Addison, Anne Bloomenthal, Rob Cederbaum, Lucy Chen, and Mona Shah provided programming support. Marjorie Mitchell and Cindy Castro word-processed and produced the report. Patricia Ciacchio and J.B. Miller edited the report. We offer our thanks to all of them.

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EXECUTIVE SUMMARY

As Medicare program costs continue to rise at rates generally viewed as unsustainable, case management of high-risk cases has emerged as a potential cost-cutting tool. The Omnibus Budget Reconciliation Act of 1990 mandated that demonstrations be conducted to “provide case management services to Medicare beneficiaries with selected catastrophic illnesses, particularly those with high costs of health care services.” It also mandated an evaluation to assess the appropriateness of providing such services to Medicare beneficiaries (in the fee-for-service sector), as well as the most effective approach for implementation. The demonstration projects were to identify groups of beneficiaries at risk of high-cost care and design the specific features of a case management intervention to reduce these costs.

Three organizations (AdminaStar Solutions, Iowa Foundation for Medical Care [IFMC], and Providence Hospital) implemented Medicare Case Management (MCM) Demonstrations in three midwest locations (Indiana, Iowa/eastern Nebraska, and suburban Detroit). After a nine-month planning phase, the projects began operating in October 1993 and continued through November 1995.

The evaluation, conducted by Mathematica Policy Research, Inc., (MPR) (HCFA 500-92-0011 [02]), documented the implementation of the demonstrations and examined their effects on Medicare costs and client outcomes. The evaluation used random assignment to develop a control group, statistically equivalent to the group of demonstration clients, to reflect what would have happened to clients had they not received case management. This document is the evaluation’s final report. The evaluation found:

- The three demonstration projects enrolled populations of Medicare beneficiaries with much higher than average Medicare reimbursements during the demonstration period.
- Each project met with low levels of initial enthusiasm for the demonstration from beneficiaries and their physicians.
- Although the projects shared core elements, case management was implemented differently and its costs varied markedly across projects.
- Despite engendering high levels of satisfaction among populations likely to have high costs, the projects generally failed to improve client self-care or health or to reduce Medicare spending.

It is unclear whether the failure of these demonstrations to reduce Medicare costs is due solely to weaknesses in the design of the specific interventions or to fundamental problems with case management as a cost-saving device. The body of research assessing the effectiveness and costs of case management interventions similar to those implemented in this demonstration is limited and its conclusions are mixed. However, this research does suggest that major changes in how case management was organized, implemented, and paid for might have lead to lower medical costs. In particular, it suggests that effective case management requires the focused, coordinated efforts of physicians, case managers, and clients. Even if changes were made, however, it would have been difficult to generate enough savings to offset case management costs.

Case Management May Have the Potential to Improve Health and Reduce the Use of Costly Care

Each year for the past two decades, a small proportion of Medicare beneficiaries has accounted for a large proportion of Medicare spending. In 1993, roughly 10 percent of Medicare beneficiaries accounted for 70 percent of the \$129.4 billion that made up total Medicare spending. The highest-cost beneficiaries tended to be hospitalized at least once during the year. In 1993, more than half of total Medicare expenditures were for hospital care (Health Care Financing Administration 1995).

High-cost case management is based on the assumption that some hospital admissions could be avoided through better self-care and improved access to services. Case management consists of identifying individuals likely to incur high health care costs, teaching them to take better care of themselves, and improving their access to support services. The belief is that such an intervention will reduce overall costs substantially by reducing the number and intensity of hospital admissions.

Some Hospital Admissions Are Avoidable

A growing body of literature suggests that some hospital admissions are avoidable. These admissions result from a lack of early diagnosis of treatable problems, nonadherence to recommended treatments (such as medication, diet, and exercise regimens), or inadequate posthospital care. Beneficiaries who experience such “avoidable” admissions are therefore prime candidates for a case management intervention that includes efforts to identify medical problems early, improve treatment regimen adherence, and coordinate posthospital care.

Congestive heart failure (CHF), for example, is a chronic illness that, to keep under control, requires a complex treatment regimen. Although CHF cannot be cured, lifestyle changes and medication can improve heart function and relieve symptoms. People with CHF need exercise to maintain circulation but must get plenty of rest to conserve energy. A therapeutic diet may be required to lose weight, to restrict salt intake, or to reduce alcoholic beverage consumption. Most CHF cases are also treated with a range of medications: diuretics to increase the elimination of urine and salt; cardiac glycosides to increase the strength of the heart’s pumping action; and vasodilators to dilate arteries, thereby reducing the heart’s work and allowing it to pump more effectively. All these drugs must be taken regularly and in the prescribed doses—often determined by blood tests. In addition, people with CHF must monitor a range of symptoms (such as shortness of breath, unexpected weight gain, and swelling in the extremities) for signals that a medication needs adjusting or that some other problem requiring a physician’s attention is emerging.

The Agency for Health Care Policy and Research’s (1994) clinical practice guidelines for heart failure recommend that “after a diagnosis of heart failure is established, all patients should be counseled regarding the nature of heart failure, drug regimens, dietary restrictions, symptoms of worsening heart failure, what to do if these symptoms occur, and prognosis.” The guidelines note that nonadherence among individuals with CHF is a major cause of illness and unnecessary hospitalization. Routine medical management of the disease frequently does not include adequate education or advice on monitoring symptoms. Practitioners often do not recognize patient nonadherence and its causes. Thus, they do not routinely stress the importance of adherence to patients during follow-up visits nor do they help them overcome barriers to adherence.

Research Findings About the Efficacy of Case Management Are Mixed

The literature on the efficacy of case management is limited and its conclusions mixed. These discrepant findings result from widely varying types and intensities of interventions, types of clients served, and settings in which studies are conducted, as well as from variations in the quality of the research designs of the studies.

Findings from High-Cost Case Management Literature	
Suggest Reductions in Overall Cost	Suggest No Effect on Overall Cost
Rich et al. (1995)*	Weinberger et al. (1996)*
Naylor et al. (1994)*	Fitzgerald et al. (1994)*
Wasson et al. (1992)*	U.S. Healthcare (1996) (unpublished)
Aliotta (1996)	
Ralin (1996) (unpublished)	
Donlevy (1996) (unpublished)	

*Indicates random assignment of study groups

Three of the six studies reporting large reductions in hospital use and total medical costs are based on pre-post designs of questionable validity, and only one of these three studies is published. The other three (Rich et al. 1995; Naylor et al. 1994; and Wasson et al. 1992) are randomized clinical trials. Of the three studies showing no effects or increases in use and cost of medical services, two (Weinberger et al. 1996 and Fitzgerald et al. 1994) are published studies of randomized clinical trials.

The Rich et al. (1995) study is the best example of a case management intervention that appears to have successfully reduced costs for high-cost clients. Rich et al. (1995) designed and tested an intervention specifically for elderly individuals hospitalized with CHF in the early 1990s. The intervention included intensive CHF education conducted by an experienced cardiovascular research nurse, dietary assessment by a dietitian, medication review by a geriatric cardiologist, a social service consultation for posthospital services, and patient followup by the hospital's home care department. Individuals over age 70 hospitalized with CHF and believed to be at high risk of readmission were randomly assigned to the intervention or regular hospital care. Over the 90 days following discharge, patients who received the intervention had 32 percent fewer readmissions, 37 percent fewer days in the hospital, and higher life quality than did control group members. The resulting cost savings more than offset the reported cost of the intervention.

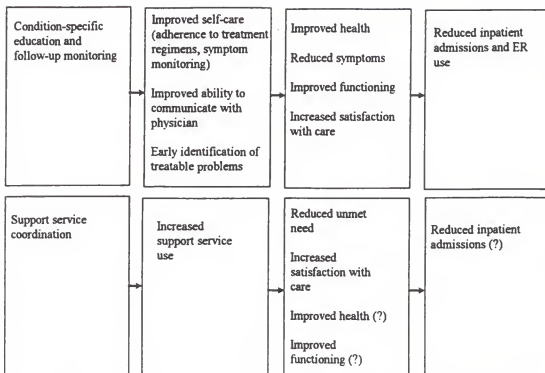
Similarly, Naylor et al. (1994) found that individuals hospitalized for CHF or a heart attack who received an intervention that comprised in-hospital education, a specially developed comprehensive discharge assessment, coordination of posthospital services, and access to a hospital-based geriatric nurse for the two weeks following discharge had a 56 percent reduction in readmissions over the six weeks following discharge when compared with members of a randomly assigned control group. The Wasson et al. (1992) study intervention differs substantially from the MCM demonstrations, but it is of interest

because it relied on telephone contacts to increase the frequency of interaction between physicians and their patients. (The MCM demonstrations relied mainly on telephone contact.) In the Wasson study, the interval between planned physician visits for monitoring was doubled and three telephone contacts were added during the interval between visits. The study, conducted over a two-year period, found 28 percent reductions in hospital admissions and in total medical care costs. While the telephone calls (eight per client, on average, over the 24-month followup) were done by a physician, it is conceivable that comparable results could have been achieved had a trained nurse in the physician's office made the calls and kept the physician informed and involved as needed. These findings are consistent with other studies suggesting that one-third to one-half of the readmissions for certain high-risk conditions are potentially preventable (see, for example, Graham and Livesley 1983) and Thornton et al. (1991), showing that 20 percent of hospital admissions in the elderly population are due to nonadherence to drug regimens or improper prescribing.

The two clinical trial studies showing no reductions raise some doubts about the efficacy of case management. The Fitzgerald et al. (1994) study involved monthly postdischarge telephone contacts for a period of one year. The clients were Veterans Administration hospital patients with a variety of conditions. Nurse case managers were involved in discharge planning, monitoring, self-care education, and keeping physicians informed. Of the 6,200 case manager contacts, one in four identified medication errors or needs, one in six identified problems with or needs for appointments, and one in seven identified early warning signals or unrecognized problems that resulted in a change in therapy or physician visit. While this rate of identification of problems seems impressive, the intervention was not intensive, costing an average of only \$100 per patient per year. The intervention had no effect on the probability of hospital readmission (50 percent) during the one-year followup, nor on the number of hospital days or admissions. The Weinberger et al. (1996) study, which also took place in Veterans Administration hospitals, involved discharge planning, but only one postdischarge followup telephone call two days after hospital discharge (plus an appointment reminder). This study found that hospital use was *increased* significantly by the intervention.

Better Self-Care Should Improve Health and Reduce Hospital Use and Spending

While research findings are mixed, some studies and the growing use of high-cost case management by health maintenance organizations suggest individuals with certain high-cost chronic conditions may suffer adverse health outcomes and receive costly care they might not have needed if they were better able to adhere to treatment regimens, had better self-care skills, or received adequate posthospital support care. Appropriately designed case management interventions have the potential to address these needs and may result in reductions in expensive hospital care if they can substantially improve self-care. Condition-specific education should improve both self-care and ability to communicate effectively with physicians. These behavioral changes should lead to a reduction in symptoms associated with a chronic illness and improved health and functioning more generally. Follow-up monitoring should increase the likelihood that treatable problems are identified as early as possible. As a result, hospital admissions and emergency room use should be reduced.



Improved support service coordination can be expected to increase the use of support services and, thus, reduce unmet need among clients, which in turn should increase satisfaction with care. However, the provision of such services (other than those aimed at the immediate posthospital period) may not necessarily result in substantially improved health or functioning or a reduced need for hospitalization. The vast literature evaluating the provision of support services for frail elderly individuals contains little evidence that such services reduce nursing home, hospital, or other costs or improve functioning.

Demonstrations Used Different Criteria and Procedures for Identifying Potential Clients

The three MCM demonstration projects each chose different target populations and developed different procedures for identifying those populations. AdminaStar chose just one diagnosis, CHF, and excluded beneficiaries with CHF who also had comorbid conditions that would make its education-focused intervention impractical (for example, Alzheimer's disease). Beneficiaries were recruited throughout Indiana. As a result of the host organization's familiarity with and access to Medicare claims data (as Medicare fiscal intermediary and carrier for Indiana), AdminaStar identified 8,002 potentially eligible beneficiaries by reviewing Medicare claims for hospitalizations with a Diagnosis-Related Group of CHF that occurred between September 1992 and December 1993. The project sent each beneficiary materials describing the intervention; those who returned its consent form were subsequently telephoned to verify their eligibility for the project. In all, 1,134 beneficiaries (14 percent of those identified) consented to participate and were subsequently verified as eligible, exceeding the project's target enrollment of 1,100 beneficiaries.

IFMC, the Iowa and Nebraska Peer Review Organization, chose two target diagnoses, CHF and chronic obstructive pulmonary disease (COPD). Beneficiaries were recruited from the Des Moines area,

western Iowa, and eastern Nebraska. IFMC identified beneficiaries primarily through the review of ongoing hospital admissions for targeted diagnoses and, whenever possible, contacted beneficiaries while they still were hospitalized. IFMC had memoranda of understanding with 10 hospitals to refer any Medicare-covered patients admitted with probable CHF and COPD. Project staff then went to the hospital to verify the eligibility of each referred patient through chart review using a set of rigorous clinical criteria. The IFMC project identified 3,628 potentially eligible beneficiaries. Of those, 2,537 (70 percent) were verified as eligible. IFMC slightly exceeded its enrollment target of 800, with 806 eligible beneficiaries participating (22 percent of those initially screened, 32 percent of eligibles).

Providence Hospital targeted eight diagnostic groups: (1) CHF, (2) COPD, (3) ischemic heart disease, (4) stroke, (5) pneumonia and sepsis, (6) major joint replacement, (7) nutritional and metabolic problems (including diabetes, dehydration, and decubitus ulcers), and (8) cancer. The project primarily recruited hospitalized beneficiaries who had a primary physician affiliated with Providence Hospital and lived within 25 miles of the hospital. (The project also recruited nonhospitalized beneficiaries who met slightly different diagnostic criteria and who were referred by their Providence Hospital physicians.) Project staff verified eligibility of patients hospitalized with one of the targeted diagnoses through chart review. The project identified 4,135 beneficiaries through this process, but only 1,674 (41 percent) were verified as eligible. Providence Hospital fell far short of its target of 800 enrollees in the demonstration. Only 442 beneficiaries (11 percent of those initially screened, 26 percent of eligibles) agreed to participate.

Demonstrations Successfully Targeted High-Cost Beneficiaries

The demonstration projects sought to develop targeting criteria and procedures that would identify beneficiaries who were likely to have catastrophic health care costs during the demonstration period. The projects appeared to have been successful in this regard, as reflected in the following comparison of Medicare service use and reimbursement for beneficiaries eligible for demonstration projects with all beneficiaries in the projects' states in 1994.

	Admina Star	Indiana	IFMC	Iowa	Nebraska	Providence Hospital	Michigan	United States
Percentage Receiving Care								
Inpatient Hospital	55.0	20.9	56.3	19.9	17.9	54.8	20.1	19.3
Skilled Nursing Facility	14.3	3.9	17.5	3.6	3.7	16.2	2.8	3.0
Home Health	30.9	8.0	37.5	7.0	6.6	56.6	8.9	9.4
Total Mean Reimbursement per Enrollee (Dollars)								
	10,063	3,945	11,882	3,080	2,926	15,970	4,307	4,375

SOURCE: State (and United States) data for 1994 from *Medicare and Medicaid Statistical Supplement, 1996* and personal communication with HCFA Office of Research and Demonstrations staff. Data describing the demonstration eligibles during the year following the participation decision are from the 1993 through 1995 National Claims History files. Project-eligible beneficiaries in this table include clients (consenting eligible beneficiaries randomly assigned to the treatment group), who make up between 5 and 10 percent of all eligible beneficiaries and whose service use may have been affected by the demonstration.

Eligible beneficiaries in each project were nearly three times as likely as the general population of beneficiaries in each of their states to have a hospital admission during the year after enrollment in (or refusal of) the demonstration. Among those who were hospitalized, mean Medicare reimbursement ranged from 9 percent higher for AdminaStar project eligibles than for other Indiana beneficiaries to roughly 25 percent higher for IFMC and Providence Hospital eligibles than other Medicare beneficiaries in their states. This suggests project eligibles also had more hospital admissions or were hospitalized for more costly Diagnosis Related Groups than others. Rates of skilled nursing facility and home health use (and mean reimbursements for users) were also much higher for project-eligible beneficiaries than beneficiaries more generally. As a result, total Medicare reimbursement was two-and-a-half to four times greater for project-eligible beneficiaries than for others in their states.

Participation Rates Were Much Lower Than Expected

Participation rates were much lower than expected for all three projects, but reasons for refusal varied. AdminaStar staff had no contact with beneficiaries who refused to participate. Nearly half of the 8,000 beneficiaries identified as potentially eligible for the AdminaStar project never responded to the project mailings; another 15 percent returned the consent form explicitly declining but giving no reason. In addition to requiring informed consent from beneficiaries, the IFMC and Providence Hospital projects required consent from the beneficiary's primary physician. Among beneficiaries eligible for the IFMC project who declined, two-thirds were physician refusals, while only one-third came from beneficiaries who declined after their physicians gave case managers permission to approach them. The high refusal rate among physicians was attributed to the "punitive" reputation IFMC had among physicians, stemming from its role as Peer Review Organization. By contrast, among beneficiaries eligible for the Providence Hospital project, only a quarter of refusals were from physicians. Roughly a third of refusing beneficiaries did so implicitly, having been discharged from the hospital after being verified eligible but never responding to the project's offer to participate. Explicit reasons for refusal included a perceived lack of need or mistrust of the project. A number of beneficiaries found having yet another form to sign while in the hospital too overwhelming. (The use of random assignment did not appear to have played any role in the high refusal rate among beneficiaries, but some physicians at the Providence Hospital project stated that random assignment had kept them from giving consent.)

Only two factors were consistently correlated with the decision to participate in case management at all three projects: age and impending death. Beneficiaries age 85 or older and beneficiaries who died within six months of the participation decision were less likely to participate. However, we observed no clear relationship between participation and severity of illness, as proxied by Medicare service use or reimbursement during the year before the participation decision.

A few project-specific factors also appeared to affect the participation decision. Among beneficiaries eligible for the AdminaStar project, those who had a hospital stay within the two months before the decision were less likely to participate. (Almost all beneficiaries eligible for the other two projects had been hospitalized shortly before they were asked to participate.) Among beneficiaries eligible for the Providence Hospital project, (nonhospitalized) community referrals were much more likely to participate than other eligible beneficiaries. (This may have been due in part to beneficiaries in this target group being referred directly by their physicians rather than recruited while hospitalized.) We had hypothesized that case managers might become more skilled at marketing the projects over time. However, those beneficiaries approached during the first six months of enrollment activities (or for AdminaStar, the earliest group approached), were no less likely to participate than those approached later.

Mortality Rates Varied; Voluntary Disenrollment Rates Were Generally Low

The IFMC and Providence Hospital interventions, each meant to last up to one year, had mortality rates that differed from one another but had comparably low voluntary disenrollment rates. Among IFMC clients, the one-year mortality rate was 26 percent, compared with 14 percent for Providence Hospital. Providence Hospital excluded beneficiaries who did not have a prognosis of at least six months to live, which partly explains its lower mortality rate. Both rates are much greater than the mortality rate for all Medicare beneficiaries (about six percent per year). The disenrollment rate during the demonstration was just two percent for IFMC and eight percent for Providence Hospital.

The AdminaStar intervention, meant to last two years, had disenrollment and mortality rates roughly comparable to those of Providence Hospital. AdminaStar's mortality rate during the intervention was 27 percent and its voluntary disenrollment rate 17 percent, which correspond roughly with the rates for Providence Hospital once the difference in the length of the interventions is taken into account. Among AdminaStar disenrollees, about two-thirds actively declined service (usually because they misunderstood what case management would entail when they agreed to participate), while the other third became ineligible (for example, by moving out of Indiana) or could no longer be reached by telephone by the case managers.

Case Management Style and Focus Differed Greatly Across Demonstrations

The three projects shared a number of key activities: client assessment and periodic reassessment, service coordination and monitoring, condition-specific self-care education, and emotional support to clients and their informal caregivers. The projects differed noticeably, however, in (1) their levels of in-person client contact, (2) the degree to which case management activities were structured or allowed to evolve based on case manager judgment, (3) their use of nurses and social workers, and (4) their emphasis on education and service coordination.

AdminaStar case managers, who communicated with clients entirely by telephone, had no opportunity for *in-person client contact*, and IFMC case managers had only limited in-person contact. However, AdminaStar staff believed roughly 10 percent of their clients would have benefited from some in-person contact. AdminaStar and IFMC staff stated that an in-home, in-person assessment would have improved their ability to address problems in clients' living environments. Providence Hospital case managers had the most in-person client contact, reassessing clients in person quarterly and making home visits as needed. They believed that some of their clients did not require in-person reassessment every quarter. However, case managers from each project believed that clients valued the easy access they had to case managers by telephone and derived a great deal of comfort from that contact.

The projects differed in the extent to which *case management activities were structured and standardized*, rather than left to the discretion of individual case managers. AdminaStar presented the most highly structured intervention of the three. Its operational protocol specified how frequently case managers were to contact clients with different levels of need, and its educational message was clearly delineated in the CHF booklet it sent to clients at enrollment and on which subsequent teaching was based. Standardized case management plans and a set of specific follow-up questions provided case managers with concrete guidelines for all client contacts. The other two projects developed and used forms, lists, and letters to standardize client assessment and communication with clients and providers. However, the

content of IFMC and Providence Hospital client contacts was left largely to the discretion of case managers.

The projects differed in their relative *emphasis on nursing and social work backgrounds for case managers*. In general, nurses are better qualified than social workers to provide self-care education, and social workers are better qualified than nurses to provide support service coordination and public assistance advocacy. AdminaStar case managers (and the project director) were all nurses from a variety of health care settings. AdminaStar had one social worker on staff to whom the nurse case managers could make referrals for support services. AdminaStar staff stated that the social worker should have had a larger role in the project. Each client should have been given a comprehensive social service evaluation at enrollment. They believed that only the more vocal clients were referred to the social worker. Some quieter clients with comparable needs were not referred because they did not make their needs known to the case managers. Providence Hospital had one social worker case manager (out of three); the case manager supervisor was also a social worker.

IFMC staff was made up entirely of nurses who also came from a variety of health care settings. By their own description, it appears that IFMC nurse case managers learned to be social workers on the job. They did not seem to be fully aware of the need for or availability of the more socially oriented services during the first year of the demonstration and learned over time the importance of networking with service providers.

Finally, projects differed in their *emphasis on client education* and, therefore, the degree to which educational efforts were focused and systematic. AdminaStar placed the greatest emphasis on education and took the most systematic and consistent approach. These efforts were made easier because AdminaStar had only one target condition on which to focus. Educational efforts at the other two projects were less systematic. The projects' relative *emphasis on service arranging and client advocacy* appeared to be inversely related to their emphasis on education. The Providence Hospital project placed the most emphasis on services and advocacy. Its relatively small service area, high level of in-person client contact, and social worker case manager facilitated such activities.

Clients Believed Case Management Improved Self-Care but Not Access to Services

Almost all clients at each project received some type and amount of education about how to manage their illness. Education focused on how to better adhere to medication, diet, and exercise regimens, how to monitor symptoms that could indicate a medical problem, and how to communicate more effectively with their physicians. In the evaluation's six-month follow-up survey, a substantial proportion of clients reported that case management had "helped [them] to take better care of [themselves]." Consistent with the relative emphasis of the AdminaStar project on teaching self-care, 81 percent of its clients who completed the evaluation's six-month follow-up survey reported that the project had improved their ability to care for themselves. The percentages reporting improved self-care were lower, but still substantial, for clients of the other two projects, at 68 percent for IFMC clients and 72 percent for Providence Hospital clients. However, much smaller percentages of clients reported that the projects had "increased [their] ability to get the care [they] needed" (for example, medical or personal care, transportation to medical care, assistance filling prescriptions, or assistance obtaining answers to condition-specific questions). Between 12 percent of clients (at AdminaStar) and 33 percent of clients (at Providence Hospital) reported improved access to these services.

The inability of the projects to increase client access to support services may have been due, in part, to the shortage of such services. During site visits, staff from each project reported that waiting lists, often long, existed for agencies that provide support services. Thus, despite their best efforts, project case managers may have only been able to get clients on waiting lists for services, not to guarantee them services. In addition, the level of functional impairment among clients was low and the level of informal care use high, suggesting that clients did not have great need for formal support services.

Case Management Costs Varied Widely Across Demonstrations

The projects varied widely in their overall costs and cost per client per month enrolled, as well as the nature of those costs. The Health Care Financing Administration (HCFA) reimbursed the projects monthly for invoiced costs, up to the limits of their annual budgets. Total costs invoiced to HCFA during the demonstration ranged from roughly \$670,000 for IFMC to \$1.2 million for AdminaStar. Case manager salaries accounted for a third of total costs for IFMC and Providence Hospital but half of total costs for AdminaStar. In addition to case manager salaries, total costs included salaries for project directors and staff from host organizations who supported the projects (such as computer programmers or accountants), other direct costs (such as the costs of travel, telephone, and computer equipment), fringe benefits, and overhead. (Overhead rates ranged from 15 percent for AdminaStar to 35 percent for IFMC.) In addition to case management per se, project activities included those for beneficiary recruitment, random assignment, case manager training, and preparation of educational materials. (Separate funds for the planning phase of the demonstrations covered such activities as development of operational protocols and databases and initial hiring of case managers.)

	AdminaStar	IFMC	Providence Hospital
Total Invoiced Cost (Dollars)	1,217,069	673,151	808,424
Case Manager Cost (Dollars)	623,364	226,952	264,543
Case Manager Cost as Percentage of Total	51.2	33.7	32.7
Total Client Months	9,381	3,540	2,169
Total Cost per Client Month (Dollars)	130	190	373

Providence Hospital (the smallest project), with an enrollment of 221 clients and just over 2,100 months of client service provided during the two-year demonstration, had the highest cost per client per month, at \$373. AdminaStar (the largest project), with an enrollment of 568 and nearly 9,400 hours of client service provided, had the lowest cost per client per month, at \$130. IFMC, at \$190, had relatively low costs per client per month.

Providence Hospital's high per-client costs are attributable to two factors. First, the cost of activities such as case finding, eligibility verification, and obtaining consent were spread over relatively few clients. In addition, the cost of assessing control group members prior to random assignment and one year later (activities not undertaken by the other two projects) and fixed costs also were spread across relatively few clients. Second, the Providence Hospital intervention had the most in-person contact and highest level of time-consuming service coordination. By contrast, AdminaStar had the lowest cost per client per month as result of having very low preenrollment costs (due to identifying potential clients through claims review), the largest number of clients across which to spread fixed costs, and the least time spent with clients.

Despite Client Perceptions, the Demonstrations Did Not Improve Self-Care or Symptom Control

Although many clients believed that the projects had improved their ability to take care of themselves, the projects generally failed to improve client self-care or symptom control relative to that of control group members. The only significant effect on self-care was that AdminaStar's clients (all of whom had CHF) increased their adherence to the recommended daily weight monitoring. We found no effects on the proportion of clients who (1) missed doses of prescribed medicine; (2) heeded their doctor's advice to quit smoking; (3) monitored their blood pressure regularly; or (4) practiced other behaviors recommended for their condition, such as (for clients with chronic lung disease) practicing breathing exercises or getting influenza shots. Consequently, we observed no significant effects on symptoms such as abnormal weight gain, breathing problems, swelling of extremities, or the need for antibiotics (other than a suggestion of a reduction in shortness of breath among AdminaStar clients).

The Demonstrations Had No Discernible Effects on Medicare Spending

Given the general absence of marked effects on self-care and symptom control, it is not surprising that none of the projects reduced hospital admission rates and costs. In their applications to be demonstration sites, the projects had each indicated large expected reductions in hospital use. AdminaStar predicted a 30 percent decline in Medicare Part A costs. Providence Hospital expected to reduce admission rates by 17 percent, and IFMC anticipated a 30 percent decline in number of admissions. However, none of the projects lowered hospital use even slightly during the demonstration period. For AdminaStar and IFMC, the client-control differences in hospital admissions, hospital days, and hospital costs were very small and statistically insignificant. For Providence Hospital, the estimated effects on these measures were statistically significant but positive, suggesting that the intervention increased the proportion of clients admitted to a hospital by 10 percentage points (from 46 to 56 percent) and increased the average number of admissions by 34 percent. Whether these are true program effects or simply chance differences is difficult to determine. Case managers may have identified some clients in need of an admission. Alternatively, since the project was hosted by a hospital, it may have been especially receptive to admitting project clients for observation or treatment. In any case, it is clear that case management did not have the *intended* effect on hospital use.

First Demonstration Year	AdminaStar		IFMC		Providence Hospital	
	Estimated Impact	Control Group Mean	Estimated Impact	Control Group Mean	Estimated Impact	Control Group Mean
Inpatient Hospital						
Any Admission (Percentage)	2.2	52.5	-1.5	61.4	10.0*	46.1
Number of Admissions	.03	1.12	.03	1.32	.31*	0.90
Reimbursement (Dollars)	-154	5,799	148	6,472	2,086	8,211
						.99
Number of Emergency Room Visits	-0.01	1.37	-0.02	1.45	.85*	
						16,212
Total Medicare Reimbursement (Dollars)	-585	10,481	801	12,851	2,280	
Total Medicare Reimbursement per Month Alive and Not in HMO (Dollars)	-35	957	-31	1,358	175	1,460

* Means statistically significant at the .10 level using a two-tailed test.

The projects also did not reduce the use of other Medicare services. While use of some services (such as physician visits) might have been expected to increase as a result of the case managers' monitoring, the expectation was that better self-care and monitoring would reduce the need for most services. The use and cost of skilled nursing facility, home health, hospital outpatient, emergency room, and physician services were not significantly lower for clients than for the control group members in any of the projects. For emergency room and hospital outpatient services, use and costs were significantly higher for Providence clients than for the control group.

We found almost no evidence suggesting that the case management projects were effective for subgroups of clients for whom the interventions were expected to be most beneficial. Impacts were not consistently greater for clients who were younger, better educated, unmarried, in rural areas, poorer, greater users of services in prior year, or more recently hospitalized than for other clients. Hospital use at AdminaStar was significantly lower for clients than for control group members among one subgroup defined by the cause of their CHF. However, the significantly *higher* use for clients than control group members with other CHF causes suggests that the differences are due to chance.

Why Were There No Impacts?

On the basis of our site visit discussions and existing literature on high-cost case management, we have identified four primary reasons for the lack of project impacts on Medicare spending or health behaviors:

1. Clients' physicians were not involved in the interventions.
2. The projects did not have sufficiently focused interventions and goals.
3. Projects lacked staff with sufficient case management experience and specific clinical knowledge to generate the desired reductions in hospital use.
4. Projects had no financial incentive to reduce Medicare spending.

Perhaps the primary reason for the lack of impacts was that case managers received *little or no cooperation from clients' physicians*. Most refusals at IFMC came from physicians on behalf of their patients, and a substantial proportion of refusals at Providence were due to physicians. (AdminaStar did not require the approval of a client's physician but tried unsuccessfully to engage physicians in ongoing case management.) Among those who did agree to have their patients enrolled, most wanted little interaction with the case manager. Although some physicians came to view the case manager as a useful ally, most essentially ignored the case manager. This was especially true in AdminaStar, which made all of its contacts with clients and physicians by telephone (or mail). Thus, there was no opportunity for case managers and physicians to develop a rapport. The case managers at all three projects felt that they would have been more effective if they and the physicians had coordinated their advice to clients and if physicians had generally supported their efforts. With a team approach, the physicians might have been able to draw on input from the case managers about whether to see clients first instead of admitting them directly to a hospital or sending them to the emergency room. In addition, clients might have been more likely to adhere to case managers' advice if their physician had told them that a case manager would be calling with further

instructions. Even in the Providence Hospital project, where the hospital employed the case managers and physicians, the case managers stated that the physicians did not think about case management much after consenting on behalf of a patient. Studies of high-cost case management stress the central importance of physician involvement and support (Rich et al. 1995; Wasson et al. 1992; Aliotta 1996; and Fitzgerald et al. 1994).

The *lack of focus* of the projects was reflected in several project-specific dimensions. Providence Hospital, for example, took clients with a variety of illnesses. This made it difficult for the project to develop materials for and train case managers on the comprehensive disease-specific self-care education that probably would help reduce the need for hospital admissions. The IFMC and Providence projects also had very little structure to their case management efforts. These projects provided little guidance on the types of activities on which the case managers should concentrate, how frequently clients at different levels of severity should be contacted, or the content of the education provided. Only AdminaStar had well-developed educational protocols. The projects also made little formal use of client outcomes. For example, clients were not consistently and systematically monitored to determine who had been admitted to a hospital and whether the admission was attributable to poor self-care or was otherwise avoidable. The level of attention two projects devoted to service arrangement may also have been ill advised for projects whose primary goals were improved health and lower health care costs. Although having case managers arrange for support services may contribute to client satisfaction, no evidence exists that additional community resources lead to measurable reductions in hospital readmissions and costs (see, for example, Wooldridge and Schore 1988).

Most of the case managers *lacked in-depth condition-specific expertise and extensive case management or community nursing experience*, although nearly all were nurses. The case managers received several days of initial training to review project procedures and clinical topics, and some completed in-service training or attended seminars. This limited training may be an inadequate substitute for a more comprehensive background in the clients' disease and in community-based care or case management. Our review of selected cases (by a nurse who specializes in case management) revealed several oversights by project case managers. Nurses with no experience in community nursing may underestimate the importance of social and environmental factors in improving the health of a client. Rich et al. (1995) cite the case managers' condition-specific training as central to the success of their case management intervention for CHF patients. Nurses with little experience with a disease may be ill equipped to identify unusual symptoms or to be able to distinguish serious symptoms or side effects of treatment from those of relatively minor significance.

A final reason for observing no impacts on service use, costs, or health outcomes may have been that the projects had *no financial incentive* to produce such outcomes. Case managers focused on providing education or arranging services but had no target outcomes (such as holding hospital admission rates below, say, 30 percent). If payment to the case management project for services delivered had been based in part on measurable outcomes, the projects might have monitored the outcomes more closely and focused their efforts more consistently on activities that would increase the likelihood of achieving these goals.

How Might Case Management Be Effective in a Fee-for-Service Setting?

Our search for evidence that some form of home-based, educationally oriented case management can yield cost savings identified the previously cited three published studies (Rich et al. 1995; Naylor et al. 1994; and Wasson et al. 1992) and two ongoing case management programs (Ralin 1996 and Donlevy

1996) with promise. Each suggests that a focused case management intervention that has a structured educational component, carefully chosen and trained staff, and strong integration with physicians can lead to markedly lower medical costs for people with CHF. The two ongoing case management programs, which focus only on CHF, include one grant-funded project conducted by a rural hospital in the fee-for-service sector and one program conducted in several health maintenance organizations by an independent contractor. Both of the ongoing case management programs claim to have produced large reductions in hospital use and total health care costs. However, the comparison methodology used to produce the estimated savings is not well documented and seems highly questionable. Although both emphasize the importance of the same features that we identify above as being necessary for a successful case management intervention, the weakness of the estimates of cost savings limits their credibility.

The best hard evidence that case management can reduce medical costs comes from the Rich et al. (1995) study. This multidisciplinary hospital-based intervention provided in a fee-for-service setting was specifically designed to prevent the hospital readmission of elderly patients with CHF. On the basis of a randomized trial, the authors concluded that the multifaceted intervention resulted in a halving of the 90-day readmission rate for CHF patients, improved quality of life, and lowered total costs. Rich et al. attribute the effectiveness of the intervention to "the focused nature of the intervention and the fact that it had multiple components." In this study, described by the authors as "nurse-directed," an experienced cardiovascular research nurse conducted most of the education and client interaction and was clearly an integral part of the client's team, not an independent agent. The study focused on a single condition, and the nurse provided intensive education, using a teaching booklet that the study team developed specifically for elderly patients with CHF. A dietitian performed client-specific dietary assessments and prepared instructions, which the nurse reinforced while the patient was still hospitalized. A geriatric cardiologist reviewed and simplified the clients' medication regimens, and the study nurse taught the clients about each medication and the dosing regimen. At discharge, the study nurse completed a summary form describing prescribed medication, dietary guidelines, and activity restrictions. The form was passed on to a nurse from the hospital's home health care division, who visited each client three times during the first week after discharge. This home health nurse reinforced the client's education, reviewed medications, diet, and activity guidelines, and performed a general physical assessment and cardiovascular examination. The study nurse contacted clients by telephone to assess their progress, answer questions, and encourage them to call study personnel at any time concerning questions, problems, or symptoms.

None of the three demonstration projects matched this level of intensity or staff skill level. AdminaStar was perhaps the closest, with its focused, structured educational intervention and its limitation to beneficiaries with CHF. None of these projects required that case managers be nurses who specialized in caring for clients with the target conditions in a community setting or incorporated reviews of diets and medications by trained professionals. Thus, the absence of impacts on hospital readmissions in these three demonstrations may be understandable.

In addition to the design features that seem to be important in reducing readmissions, case management interventions could have learned much from focused monitoring of the clients and greater attention to client outcomes. For example, when readmissions occur, the case manager/physician team should assess them to determine if they were preventable. What led to the readmission? Was the client not adhering to advice concerning diet, medication, smoking, or exercise? Were there symptoms the client did not recognize as signaling an acute exacerbation? How do the "successes"—those clients who avoid readmissions—differ from those who are readmitted? Is case management especially effective or ineffective for some types of client attitudes, characteristics, or family situations? Can the intervention be modified to address any identified barriers to adherence? A second type of potentially helpful ongoing

monitoring of the intervention is comparison of outcomes across individual case managers. Is client adherence with recommended behavior higher for some case managers than others? If so, why? How can less effective case managers be trained to become more effective?

Medicare Savings May Not Be Large Enough to Cover Case Management Costs

Even if case management can lower Medicare costs for medical services, the reductions may not be enough to offset the cost of case management. The Rich et al. (1995) study found that the its intervention saved enough money on hospital admissions to more than cover the cost of case management. The case management costs reported (\$72 per month), however, are much lower than those our demonstration projects recorded, despite the fact that the Rich study intervention was more resource intensive. This may be, in part, because the intervention did not spend resources recruiting patients, training case managers, and engaging in other activities included in the demonstration projects' costs. The study also did not report start-up costs, overhead costs, or some other costs that would be incurred in an ongoing case management program. Thus, reliable case management cost estimates are needed to provide convincing evidence that savings will be achieved if impacts on hospital readmissions are within the range the Rich study found.

Unless more effective case management can be provided for no more than the costs in two of the demonstration projects evaluated here, it is not likely to be cost-effective. The lowest estimate of total billed costs for the three projects, \$130 per client month for AdminaStar, was approximately 14 percent of the \$957 average Medicare costs per month alive incurred by these clients during the year after enrollment. IFMC had higher case management costs (\$190), but higher Medicare costs as well (\$1,358 per month alive), yielding essentially the same ratio of case management costs to Medicare costs. This may be the maximum proportion of costs that can be incurred for case management if there are to be sufficient net savings to provide adequate financial incentive to case management providers and savings to HCFA. The Rich study intervention cut medical costs by about 23 percent during the three-month intervention. If that figure is an accurate estimate of the expected percentage savings from effective case management, the net savings from a program with case management costs like AdminaStar or IFMC would be about 9 percent of medical costs (23 percent minus 14 percent). Smaller amounts of expected savings may not generate enough interest on the part of either HCFA or potential case management contractors, given that the net savings must be distributed between them.

For the Providence Hospital project, case management would have to have been both more effective and less costly. The average monthly case management costs (\$373) were 26 percent of the \$1,460 Medicare costs, leaving no savings to distribute if Medicare costs can only be cut by 23 percent.

The potential may exist, however, to provide more effective case management without increasing costs over those observed in the MCM demonstrations. A significant fraction of the costs of the IFMC and Providence projects was for recruiting beneficiaries and verifying eligibility. These costs should be lower in an ongoing, physician-integrated case management project conducted by a hospital, physician group, or home health agency. Furthermore, the proportion of costs spent on case management staff was relatively low in all three projects. AdminaStar spent half of its funds on the wages and salaries of case managers and supervisors. The other two projects spent only about one-third of their total costs on these salaries. It should be feasible to keep other labor and nonlabor costs well below two-thirds of the total costs of a case management intervention. The Rich et al. (1995) and Wasson et al. (1992) studies both found costs of their interventions to be substantially less than the savings generated in medical costs.

Alternative Fee-for-Service High-Cost Case Management Models Might Yield Savings

The ability of case management to yield lower Medicare costs will depend on the setting in which case management is implemented and how it is paid for. The Rich et al. study suggests that a hospital setting can provide the greater focus, optimal staffing, and physician involvement necessary for case management to reduce admissions. However, hospitals have no resources to pay for case management, nor do they have an incentive to reduce admissions. On the other hand, strong financial incentives in other settings may not yield effective case management. Unless clients' physicians work closely with the case managers, case management is unlikely to succeed. Physician involvement is much more likely in some settings than others.

We have identified three possible models for paying for case management that might yield savings, as well as a number of payment and organizational issues that would have to be resolved for it to work. The three options are (1) to have hospitals or physician groups contract with HCFA to provide all Medicare-covered services needed by a beneficiary with a particular diagnosis (such as CHF) in return for a fixed capitation payment; (2) to pay case management providers a share of any estimated savings in Medicare costs for their clients; or (3) to pay case management providers directly for case management services rendered, with a modest bonus if there are savings in Medicare costs for their clients. The options all provide a financial incentive for contractors to implement effective case management programs, and all would be limited to beneficiaries with particular diagnoses. However, the options differ in terms of who bears the financial risk if Medicare savings fall short of the costs of case management. They also differ in the types of organizations best suited to provide case management, how the payment mechanism would work, and potential implementation problems.

The first option is to pay health care providers a fixed capitation payment, in return for their providing or covering the cost of all Medicare services required by the beneficiary with the target diagnosis over a specified period of time after enrollment (for example, one year). The payment would be set at a rate somewhat (for example, 5 or 10 percent) below the historical Medicare fee-for-service cost for such beneficiaries in the same geographic area, to yield savings to HCFA. The contractors would not necessarily be required to implement case management, but this would be strongly encouraged. Those not doing so should be required to demonstrate how they expect to produce adequate care at the lower level of reimbursement implicit in the capitation rate. The contractor would have to recoup all costs of the case management by keeping medical costs below the capitation rate.

The second payment option also would force contractors to recoup the costs of case management through savings on Medicare costs but would rely on conventional fee-for-service payments for Medicare services. The savings would be estimated by comparing actual Medicare costs for enrolled beneficiaries to expected costs for such beneficiaries. Savings would be shared with the contractor, with most of the savings given to the contractor to offset the cost of the case management. Contractors under this arrangement, which could include home health agencies and insurers as well as hospitals and physician groups, would be required to implement case management to participate.

Under the third option, HCFA would pay a monthly fee to contractors for providing case management services, with a modest bonus for generating savings in Medicare costs. This option transfers from contractors to HCFA the risk that medical savings will not be sufficient to offset the costs of case management. Risk can be shared somewhat by paying contractors only a proportion of their expected costs of providing case management, with the rest to be recouped from savings in Medicare costs. Under this arrangement, home health agencies, hospitals, physician groups, or insurers could contract with HCFA.

This option should be restricted to contractors serving a sufficiently large number of beneficiaries to cover the large fixed costs of setting up a comprehensive case management program.

Each of these options has some potentially significant shortcomings. Capitation and shared savings under fee-for-service reimbursement both could result in overpayments if contractors enrolled beneficiaries who were healthier, on average, than the typical beneficiary with the target diagnosis (favorable selection). This problem could be lessened by having different rate cells for beneficiaries at different levels of severity. Perhaps most important, many qualified organizations may be reluctant to participate under these first two options because of the considerable financial risk. Only those that are experienced with case management and confident of generating sizable Medicare savings compared with their current performance are likely to be interested. The third option--having HCFA pay for case management and share any net Medicare cost savings--might be the best option for a demonstration. However, special attention would have to be paid to ensuring that physicians are actively engaged in the case management process if these services are paid for separately. Some risk sharing with contractors (for example, withholding 20 percent of case management costs) should be incorporated in such a system to create strong incentives for effective case management. However, it may be difficult for HCFA and contractors to agree on what is a reasonable estimate of the cost of case management and the size of expected savings in Medicare costs.

Case Management Providers Must Demonstrate Strong Physician Involvement

Although there are a number of issues regarding what type of organization should be allowed to contract with HCFA for case management under each option, it seems clear that this group should include only those that can demonstrate convincingly that physicians will be well integrated. Some of the most knowledgeable case management providers may be independent organizations whose sole focus is client education and monitoring for specific diseases. However, unless the physicians view the case managers as part of the care team and treat them as such throughout the client's illness, hospital admissions probably will not decline noticeably. The critical requirements in considering such firms should be clearly demonstrated awareness of the importance of this link and proven ability to work with physicians in a fee-for-service setting. Consortiums of hospitals or physicians with independent case management providers may be particularly attractive arrangements, if the physicians are willing and active participants in the agreement.

Where Do We Go from Here?

Given the lack of impacts from the current demonstration projects, more carefully designed case management projects must be defined, pilot tested, and evaluated before such a program can be considered for fee-for-service Medicare. Conducting a demonstration for one or two particular conditions in several sites to see if the impacts similar to those found by Rich et al. (1995) and Wasson et al. (1992) can be replicated would also provide a test of the design features to be worked out. If these demonstration programs are successful, it should be possible to proceed fairly quickly to implement a national case management program for these conditions. Expanding case management to other conditions could be examined in other demonstrations, either concurrently with this demonstration or afterward.

Despite the experience of these three demonstration projects, the widespread use of case management by health maintenance organizations and the experience reported in a few studies suggest that *carefully designed* case management interventions for certain high-cost conditions might save money for HCFA on

fee-for-service Medicare. The challenge will be for providers to design such interventions that do not cost more than the medical cost savings. If this can be accomplished, HCFA may reduce costs in the most desirable way—by enhancing the ability of some of the highest-cost beneficiaries to practice effective self-care, thereby reducing their need for resource-intensive care.

I. CONTROLLING CATASTROPHIC HEALTH CARE COSTS WITH CASE MANAGEMENT

The Medicare Case Management (MCM) Demonstrations were originally mandated by the Medicare Catastrophic Coverage Act of 1988. Although the Medicare Catastrophic Coverage Act was subsequently repealed, the demonstrations were reactivated by the Omnibus Budget Reconciliation Act of 1990. The Act required the demonstrations to “provide case management services to Medicare beneficiaries with selected catastrophic illnesses, particularly those with high costs of health care services.” It also mandated an evaluation to assess the appropriateness of providing such services to Medicare beneficiaries in the fee-for-service sector, as well as the most effective approach for implementation. The demonstration projects were to identify groups of beneficiaries at risk of high-cost care and design the specific features of a case management intervention to reduce their costs.

Three organizations (AdminaStar Solutions, Iowa Foundation for Medical Care [IFMC], and Providence Hospital) implemented the MCM Demonstrations in three geographic areas (Indiana, western Iowa/eastern Nebraska, and suburban Detroit). After a nine-month planning phase, the projects began operating in October 1993 and continued through November 1995. This document, the evaluation’s final report, assesses the effectiveness of the demonstrations in identifying high-cost beneficiaries, improving their health, and reducing their health care costs.

A. IDENTIFYING HIGH-COST BENEFICIARIES

For the past two decades, a small proportion of Medicare beneficiaries has accounted for a large proportion of Medicare spending. In 1993, roughly 10 percent of Medicare beneficiaries accounted for 70 percent of the \$129.4 billion that made up total Medicare spending. Some of the highest-cost users of Medicare services in 1993 included beneficiaries with end-stage renal disease, those who died during the year, and those who were hospitalized at least once. A large percentage of total Medicare spending

historically has been for inpatient hospital care. In 1993, more than half of total expenditures was for hospital care (Health Care Financing Administration 1995).

For a case management intervention to be successful, it is necessary to identify individuals who are likely *both* to have high health care costs and to benefit from the intervention. Evaluations of case-managed interventions to reduce public and private spending for frail elderly individuals (by substituting home- and community-based services for nursing home care) found that the interventions did not reduce spending because they did not successfully target individuals who would enter nursing homes in the absence of the intervention (see, for example, Kemper et al. 1987). The interventions could not identify individuals who were highly likely to be admitted to nursing homes in the near future *and* for whom the need for nursing home placement could be overcome with the aid of a case manager (and additional home care services). Thus, for the MCM Demonstrations to improve health and reduce health care costs, it was crucial for the projects to identify beneficiaries who were likely to have costly hospitalizations and other catastrophic costs *and* for whom these costs could be substantially reduced by the types of case management provided.

A growing body of literature suggests that some hospital admissions are avoidable. Such admissions include those caused by a lack of early diagnosis of treatable problems, inadequate posthospital care, or patient nonadherence to recommended treatments. Therefore, beneficiaries who experience avoidable admissions are prime candidates for a case management intervention that includes efforts to identify medical problems early, to coordinate posthospital care, and to improve adherence to a treatment regimen.

Research has not consistently identified a single set of criteria that predicts which individuals are likely to have high future health care costs. Some evidence indicates that the highest-cost patients are more likely to be those with repeat hospitalizations for the same disease than those with a single prolonged or resource-intensive stay (Zook and Moore 1980). Other evidence indicates that high-cost patients tend to

have repeated hospitalizations for possibly unrelated comorbidities (see, for example, Eggert and Friedman 1988; and Fethke et al. 1986).

Andrews et al. (1994) found that, in 1987, ischemic heart disease, cerebrovascular disease, congestive heart failure (CHF), pneumonia/influenza, and acute myocardial infarction were the five most costly and numerous discharge diagnoses for Medicare-covered hospitalizations and accounted for more than a quarter of all Medicare-covered hospital charges. However, individuals with some of these conditions are exceptionally likely to have comorbid conditions, which may have contributed to the cost of their hospitalizations. In 1986, for example, 89 percent of all Medicare-covered hospitalizations with a primary diagnosis for intermediate coronary syndrome (a type of ischemic heart disease) had at least one secondary diagnosis, while 62 percent of those with CHF had at least one secondary diagnosis (U.S. Department of Health and Human Services 1993).

CHF is a particularly costly chronic condition and one for which repeat hospitalizations are common. CHF was the only target diagnosis shared by all three MCM Demonstration projects. In 1990, treatment of individuals of all ages with CHF totaled \$10 billion, 70 percent of which was for hospital care. In 1992, Medicare paid \$2.4 billion for 654,000 hospital admissions with a principal diagnosis of heart failure (Agency for Health Care Policy and Research 1994). Rich et al. (1995) noted that CHF has been associated with three- to six-month readmission rates of between 29 and 47 percent. They also identified hospitalized CHF patients as being at particularly high risk of rehospitalization if they had a history of heart failure, had four or more hospitalizations for any reason in the preceding five years, or had CHF that was precipitated by a heart attack or uncontrolled hypertension.

Certain nondisease factors also have been associated with hospital readmissions and, therefore, may be associated with high costs. These include life satisfaction, widowhood, and lack of informal support (see, for example, Fethke et al. 1986; and Schlenker and Berg 1989). Thus, high-cost patients have been

identified along a number of different dimensions, including specific medical conditions, hospitalization, terminal illness, and level of life satisfaction and social support.

B. CASE-MANAGED INTERVENTIONS TO REDUCE HIGH COSTS

1. Which Costs Are Avoidable?

Some types of high-cost care may be reduced with case-managed interventions, while others may not. Care of individuals with terminal illness, one of the Health Care Financing Administration's (HCFA's) 1993 high-cost groups (Health Care Financing Administration 1995), may be an example of inherently high-cost care. Hospice care uses a case-managed approach in providing an alternative to traditional care for individuals with terminal illness. Hospices stress multidisciplinary palliative care rather than the treatment of illness and emphasize care delivered in the individual's home rather than at a facility. Originally, hospice care was believed to be less expensive than traditional medically oriented, hospital-based care for individuals with terminal illness. Studies of one of the few hospice demonstrations using random assignment, however, found no difference in hospital use or in total care costs between hospice and traditional care (Wales et al. 1983; and Torrens 1985). Thus, by its nature, care of individuals with terminal illness may be expensive regardless of the approach. Medicare hospice benefit studies have been inconclusive, because they could not identify a well-matched comparison group (Mor and Birnbaum 1983; Mor and Kidder 1985; and Kidder et al. 1989).

Similarly, care received by Medicare beneficiaries eligible as a result of end-stage renal disease, another of HCFA's high-cost groups, appears to be inherently high-cost care. In 1993, the average per-person Medicare payment for beneficiaries with end-stage renal disease, at \$30,296, was more than seven times higher than payments for beneficiaries without this disease. This may be because, to be eligible for Medicare as a result of end-stage renal disease, beneficiaries must *require* high-cost kidney transplantation or ongoing dialysis to live (Health Care Financing Administration 1995).

On the other hand, some health care seems to result from events that could have been avoided. For example, Weissman et al. (1992) examined hospitalizations for CHF, pneumonia, diabetic coma, and several other conditions that they believed could have been avoided with more timely and effective ambulatory care. They found individuals with private insurance (and, thus, potentially with better access to care) were less likely to be hospitalized for these diagnoses than individuals with no insurance or Medicaid. Weissman et al. noted that, except in the case of diseases for which immunizations exist, avoidability is a matter of degree and is greatly complicated in chronic conditions that have particularly complex treatment regimens. Moreover, individuals with primary diagnoses of chronic illness often have one or more comorbid chronic conditions. (For example, it is not unusual for an individual with CHF to have diabetes also.)

The very complexity of treating individuals with chronic illnesses suggests they may be at greatest risk of hospitalizations *that are potentially avoidable*. Many elderly individuals with chronic illness have difficulty understanding complex treatment regimens. Such regimens often include medications taken on different schedules and with differing side effects, and recommendations for lifestyle changes (related to diet, smoking, drinking alcohol, or exercise). This lack of understanding frequently reduces adherence to recommendations, which, in turn, may lead to hospitalization. Even with full adherence, individuals with chronic illnesses often are hospitalized; then, they must recover from the physical decline that typically accompanies a hospital stay. In addition, they may leave the hospital with medical or personal care needs that go unmet, causing a return to the hospital. Thus, individuals with chronic illness often face a range of potentially avoidable problems.

a. Nonadherence to Treatment Regimens

A number of studies have correlated patient nonadherence to treatment regimens with high-cost care. Consider CHF once again as an example of a chronic illness that requires a complex treatment regimen. Although CHF cannot be cured, lifestyle changes and medication can improve heart function and relieve

symptoms. Individuals with CHF need exercise to maintain circulation but must get plenty of rest to conserve energy. A therapeutic diet may be required to lose weight, restrict salt intake, or reduce alcoholic beverage consumption. In most cases CHF is also treated with a range of medications: diuretics to increase the elimination of urine and salt; cardiac glycosides to increase the strength of the heart's pumping action; and vasodilators to dilate arteries, thereby reducing the heart's work and allowing it to pump more effectively. All these drugs must be taken regularly and in the prescribed doses--often determined by blood tests (see, for example, Brunner and Suddarth 1986). In addition, patients must monitor a range of symptoms (such as shortness of breath, unexpected weight gain, and swelling in the extremities) for signals that a medication needs adjusting or that some other problem requiring a physician's attention is emerging. Thus, patients with CHF frequently have treatment regimens to which they could better adhere with education and ongoing monitoring.

The Agency for Health Care Policy and Research's (1994) clinical practice guidelines recommend that "after a diagnosis of heart failure is established, all patients should be counseled regarding the nature of heart failure, drug regimens, dietary restrictions, symptoms of worsening heart failure, what to do if these symptoms occur, and prognosis." The guidelines note that nonadherence among individuals with CHF is a major cause of illness and unnecessary hospitalization. Management of the disease often does not include adequate education or advice on monitoring symptoms, and practitioners frequently do not recognize patient nonadherence and its causes.

Nonadherence to medication regimens, in particular, is a leading factor in hospital admission among the elderly population in general. Medication nonadherence is a particular problem among individuals with multiple chronic conditions and multiple medications. The problem worsens over time because individuals often tire of the regimens. Thornton et al. (1991) noted that researchers have estimated that 10 percent or more of hospital admissions for elderly people are due to illness caused by improper drug use, drug interactions, or the redundant use of drugs in the same pharmacological class. This percentage almost

doubled when researchers included admissions for an exacerbation of a condition resulting from poor adherence to a medication regimen.

Montamat et al. (1989) found overall incidence of adverse drug reactions in elderly people to be two to three times greater than that found in young adults. The incidence is higher in part because elderly people take more medications and in part because of differences that affect drug absorption and excretion (for example, relative amounts of total body water, lean body mass, and body fat; reduced liver and renal function; and malnutrition) that physicians often do not take into account in setting dosages. Montamat et al. also noted that nonadherence to drug regimens may occur in one-third to one-half of all elderly patients and that up to 90 percent of this nonadherence may be underadherence--taking too little of a prescribed medication. Montamat et al. ascribed nonadherence to poor communication with health professionals, combined with a decline in cognitive ability associated with chronic illness. They believed that underadherence might occur with patients who intentionally alter intake to minimize adverse effects. Another important factor in underadherence (not mentioned by Montamat et al.) may be the inability of some elderly individuals to afford their prescribed medications in light of the fact that Medicare does not cover medications.

b. Inadequate Posthospital Care

Although relatively little research has been conducted on the specific effect of inadequate posthospital care on hospital readmission, lack of access to adequate care after discharge appears to be associated with adverse outcomes. Phillips (1990) classified patients who were discharged from nine hospitals into care-needed categories on the basis of characteristics at discharge and specified minimum amounts of care to prevent adverse outcomes. She found that patients whose care needs were not met during the first two weeks after discharge were almost three times as likely to have adverse outcomes as those whose needs were met. A 1986 study that interviewed 1,100 elderly patients within three weeks of discharge found that only 21 percent received formal discharge planning, even though 97 percent felt they had medical or social

service needs, and a third of these felt they had unmet needs (Marron et al. 1992). Moreover, this study found that, although formal discharge planning reduced levels of unmet medical need following hospitalization, it did not reduce levels of unmet social needs. Naylor et al. (1994) note that the incentives of hospital prospective payment to discharge elderly patients as quickly as possible have increased the need for effective discharge planning at a time when the quality of discharge planning for elderly individuals has generally been recognized as poor.

c. Iatrogenic Problems

Iatrogenic problems (adverse events that occur in the hospital) may lead to longer stays and possible readmissions, particularly for elderly individuals. Some of these problems could be avoided if a case manager had the authority to visit and intervene on behalf of hospitalized clients. For example, the physical decline caused by bed rest and the use of tethers (such as intravenous lines, catheters, or other devices that largely confine the patient to bed) superimposes enforced immobilization, reduction of plasma volume, and accelerated bone loss on functional declines associated with normal aging (reduced muscle strength and aerobic capacity, vasomotor instability, reduced bone density, and fragile skin). In addition, elderly hospital patients suffer from sensory deprivation if eyeglasses, hearing aids, or dentures are stored out of reach (Creditor 1993). Kane et al. (1989) note that other iatrogenic problems elderly people frequently face include overzealous labeling of patients as demented or incontinent, polypharmacy, enforced dependency, and transfer trauma. Creditor notes that the hospital environment can be changed to reduce physical decline and sensory deprivation by encouraging and assisting with ambulation, using reality orientation, increasing sensory stimulation, and encouraging family participation in care, as well as by making beds lower, eliminating bed rails, and minimizing tethers.

Thus, there appears to be a range of avoidable problems confronted by elderly individuals, particularly those with chronic illness. These problems frequently lead to adverse outcomes and subsequent health care and many could be addressed with a case-managed approach.

2. Can Case-Managed Interventions Reduce Costs?

Case management is a widely used term that encompasses various types of activities with different target populations and different goals. In addition to its historic role in coordinating the fragmented service delivery system for the frail elderly population, case management has become an increasingly popular tool to reduce unnecessary health care. Insurance companies, managed care organizations, and employers now commonly use case management to monitor spending for individuals with catastrophic medical problems or special needs (such as those with diabetes or acquired immunodeficiency syndrome). Hospitals are using case management to reduce resource use and coordinate care during hospitalizations, as well as to provide oversight of posthospital care for certain types of patients. With these wider uses, however, the specific features of case management often deviate from those of traditional case management (comprehensive in-person assessment and periodic reassessment, development and implementation of care plans, and service coordination and monitoring). Furthermore, the traditional role of the case manager as a counselor and client advocate sometimes is altered, as case managers seek to balance the interests of their employers against the needs of their clients.

In this section, we briefly review two approaches to reducing health care costs among the elderly population: (1) patient education and self-management assistance; and (2) enhanced hospital discharge planning. Components of these approaches were (or could have been) incorporated into the MCM projects.

a. Patient Education and Self-Management Assistance

Lorig (1993) notes that the health care delivery system addresses the prevention of illness through the public health system and the treatment of acute illness through the medical care system, but it has not been particularly responsive in helping individuals live with chronic illness. Since 75 percent of elderly individuals have at least one chronic condition, this omission represents a substantial gap. Over the past

few years, there has been growing emphasis on giving elderly individuals (particularly those with chronic conditions) the information and empowerment they need to carry out effective self-care or self-management, to fill the chronic-care gap in the current health care delivery system.¹ Living successfully with chronic illness requires that patients adhere to treatment regimens, control symptoms to the extent possible, and adapt everyday activities in order to function as fully as possible (Lorig 1993; and Mockenhaupt 1993).

Effective self-care requires good information on appropriate home treatments and preventions, including when to seek professional help. It also requires an individual to have the ability and willingness to take an active role in medical decision making. Written material is one means of communicating self-care information. Mettler and Kemper (1993) found that 60 to 70 percent of people receiving self-care handbooks used them and that newsletters and follow-up letters could effectively reinforce information contained in the books. They also found that patients could be coached with information to understand physicians better, to help them think of questions to ask physicians, and to take a more active role in medical decision making. They cite health maintenance organization (HMO) initiatives that provide this type of coaching over the telephone using specially trained nurses (sometimes referred to as advice nurses). However, it is difficult to identify those individuals likely to be willing and able to effectively learn and practice self-care (Stoller and Pollow 1994).

Teaching effective self-care also requires professionals with the time to teach and interest in doing so. DeFries and Konrad (1993) note that the potential for teaching self-care increases when nurse practitioners, physician's assistants, and physical and occupational therapists deliver primary care. These professionals often have the training and inclination (as well as lower personnel costs than physicians) that

¹Mettler and Kemper (1993) define self-care as "what people do to recognize, prevent, treat, and manage their own health problems" either with or without the assistance of a physician. Lorig (1993) defines self-management as "learning and practicing skills needed to carry on an active and emotionally satisfying life in the face of a chronic condition."

allow them to spend time with older patients. Extra time allows them to explain medication regimens, demonstrate self-care routines, and analyze the context in which periodic flare-ups occur among older patients with apparently stable chronic-care needs. The most significant contribution may be motivating patients to take a more aggressive approach to their own health.

In recent years, many managed care organizations, insurers, and employers have introduced intensive education, service coordination, and followup by nurse case managers to reduce future spending for individuals with chronic illnesses by helping them adhere to treatment regimens. Diabetes is an example of a chronic illness for which the typically high costs may be lessened with careful, intensive, ongoing management to reduce long-term complications, as shown in the Diabetes Control and Complications Trial (Diabetes Control and Complications Trial Research Group 1993). Case-managed diabetes interventions have included education using teaching nurses, specialized care teams, formal classes, and ongoing education. Interventions have also included monitoring by nurses and dietitians who perform home visits, with telephone and in-person followup, to tailor educational efforts to individual needs and living situations (Anderson 1996; Ziegler 1996; Hurley 1996; and Smith and McGhan 1996). Some studies of high-cost case management implemented by HMOs have reported large reductions in hospital use and total medical costs, but have been based on pre-post designs of questionable validity (see for example, Aliotta 1996; and Ralin unpublished). Rigorous evaluation of high-cost case management in a managed care setting seems to be entirely lacking.

b. Enhanced Hospital Discharge Planning and Related Interventions to Reduce Readmission

Medicare regulations require that hospitals identify early in an admission those patients likely to suffer adverse health outcomes upon discharge, evaluate such patients for discharge plans, and provide plans for those who need them. The plans must be developed by a nurse, social worker, or other qualified professional. Despite the regulations, not all patients who need posthospital care get discharge plans, and, as Naylor et al. (1994) and Mamon et al. (1992) point out, needs go unmet even for some who do get them.

As it has become apparent that routine discharge planning makes a poor safety net for elderly hospital patients, enhanced discharge planning interventions have been developed to facilitate recovery from acute illness and to reduce the likelihood of patients' suffering unnecessary complications that would lead to prolonged or repeated hospital stays. Enhanced discharge planning often uses an individual or a multidisciplinary team working with or in place of a regular discharge planner to assess patients' medical and psychosocial needs. Enhanced discharge planning that includes short-term follow-up case management has been referred to as transitional case management. Enhanced discharge planning may be part of an inpatient nurse case management program, which also coordinates care while the patient is in the hospital (see, for example, Cohen and Cesta 1994).

Rich et al. (1995) designed and tested an intervention specifically for elderly individuals hospitalized with CHF in the early 1990s. The intervention included intensive CHF education conducted by an experienced cardiovascular research nurse, dietary assessment by a dietitian, medication review conducted by a geriatric cardiologist, a social service consultation for posthospital services, and patient followup by the hospital's home care department. Individuals over age 70 hospitalized with CHF and believed to be at high risk of readmission were randomly assigned to the intervention or regular hospital care. Over the 90 days following discharge, patients who received the intervention had 32 percent fewer readmissions, 37 percent fewer days in the hospital, and higher life quality than did control group members. The resulting cost savings more than offset the reported cost of the intervention.

Similarly, Naylor et al. (1994) found that individuals hospitalized for CHF or a heart attack who received an intervention that comprised in-hospital education, a specially developed comprehensive discharge assessment, coordination of posthospital services, and access to a hospital-based geriatric nurse for the 2 weeks following discharge had fewer readmissions over the 12 weeks following discharge than members of a randomly assigned control group. While not a post-hospital intervention, Wasson et al. (1992) assessed a randomized study of the use of on telephone contacts to increase the frequency of

interaction between physicians and their patients and to reduce the costs of care. For individuals in the intervention group, the interval between planned physician visits for monitoring was twice as long as was standard practice but three telephone contacts were added during the interval between visits. The study, conducted over a two-year period with male veterans over the age of 54 with a variety of chronic conditions, found 28 percent reductions in hospital admissions and in total medical care costs.

On the other hand, two clinical trials of enhanced discharge planning showed no reductions in hospital use. Fitzgerald et al. (1994) assessed an intervention of monthly post-discharge telephone contacts for a period of one year. The study group were Veterans Administration hospital patients with a variety of conditions. Nurse case managers were involved in discharge planning, monitoring, self-care education, and keeping physicians informed. Of the 6,200 case manager contacts, one in four identified medication errors or needs, one in six identified problems with or needs for appointments, and one in seven identified early warning signals or unrecognized problems which resulted in a change in therapy or physician visit. While this rate of identification of problems seems impressive, the intervention was not intensive, costing an average of only \$100 per patient per year. The intervention had no effect on the probability of hospital readmission (50 percent) during the one-year followup, nor on the number of hospital days or admissions. Weinberger et al. (1996), which also took place in Veterans Administration hospitals, involved discharge planning and inpatient education by a primary care nurse, but only one post-discharge followup telephone call two days after hospital discharge (plus an appointment reminder). Weinberger et al. found that hospital use was *increased* significantly by the intervention.

Thus, the conclusions of literature are both limited and mixed on the efficacy of various approaches to improving the health of individuals with high-cost conditions and thereby reducing overall health care spending.

C. THE MEDICARE CASE MANAGEMENT DEMONSTRATIONS

The three MCM Demonstrations were implemented by different types of organizations, each with its own target population and approach to case management. However, HCFA established broad guidelines for the demonstrations, stating that the projects were to (1) identify beneficiaries likely to incur high medical costs for conditions potentially responsive to case management, (2) develop needs assessments and alternative plans of care for such individuals, and (3) coordinate (or deliver) an efficient and effective mix of services. All three projects shared the goals of improving the health of and reducing adverse outcomes for targeted Medicare beneficiaries and, thus, lowering their health care costs. HCFA provided the demonstration projects with a nine-month planning phase and a two-year implementation phase. In this section, we present an overview of the three projects.²

1. Host Organizations and Their Prior Case Management Experience

Each of the three MCM project host organizations had its own vision of case management based on prior experience. AdminaStar Solutions (Indianapolis, Indiana) provides administrative services to government agencies and organizations conducting government contracts. For example, it provides case management services for catastrophically and chronically ill beneficiaries of the Indiana and Iowa uninsured risk pools and cost containment services for private preferred provider organizations and HMOs. IFMC (West Des Moines, Iowa) is the Iowa and Nebraska Peer Review Organization. It also has provided case management services for catastrophically ill beneficiaries of private insurers, a cornerstone of which is purchasing services that the insurer does not usually cover. Providence Hospital (Southfield, Michigan) is a large teaching hospital. Its demonstration project was an initiative of the geriatrics and family medicine departments. Improving the health status of elderly individuals was one of the hospital's five-year goals

²For a detailed description of the demonstration projects during the first implementation year, see Schore et al. 1995.

at the time of the demonstration, and the hospital provides numerous services (such as adult day and respite care) for elderly members of the community.

2. Target Groups and Enrollment Goals

Under the demonstration, each project had to identify a population likely to incur high medical costs for conditions that could be responsive to project case management. Each project identified its target population on the basis of medical diagnosis, usually for a chronic condition historically associated with high rates of hospital readmission. In addition, to be eligible for the demonstration, a beneficiary must have had Medicare Parts A and B coverage and not have been enrolled in an HMO.

The target populations for the three projects differed, but they overlapped somewhat; project size also differed. AdminaStar's target was beneficiaries residing in Indiana with a diagnosis of CHF. It planned to recruit 1,100 beneficiaries for its project. IFMC's target was beneficiaries with CHF or chronic obstructive pulmonary disease (COPD) residing in four regions of Iowa and Nebraska. It planned to enroll 800 beneficiaries. Providence Hospital's target included beneficiaries with CHF, COPD, and six other diagnoses (or diagnostic categories) who had primary physicians affiliated with the hospital. Its initial enrollment goal was 1,500 beneficiaries. For each project, half the recruited participants were randomly assigned to receive case management; the other half served as a control group.

3. Referral and Consent Processes

The projects diverged substantially in their approaches to identifying targeted beneficiaries. AdminaStar reviewed Medicare claims to identify potentially eligible beneficiaries. It then sent material describing the project, as well as a consent form, to each beneficiary with a recent hospitalization for CHF. All beneficiaries who returned the signed consent form project staff then called to verify their eligibility. IFMC and Providence Hospital identified beneficiaries primarily through the review of ongoing hospital admissions for targeted diagnoses; whenever possible, they contacted beneficiaries while they were still

hospitalized. IFMC had agreements with 10 hospitals to refer any Medicare-covered patients admitted with probable CHF and COPD. Project staff then went to the hospital to verify the eligibility of each referred patient through chart review and presented the project to eligible patients. Providence Hospital project staff reviewed the Providence Hospital admissions logs each day for potentially eligible patients. Staff then verified eligibility through chart review and presented the project to eligible patients. Only AdminaStar obtained beneficiary consent *before* verifying eligibility.

In addition to requiring informed consent from eligible beneficiaries, IFMC and Providence Hospital also required consent from the beneficiary's primary physician. In fact, the projects obtained consent from physicians before approaching beneficiaries. Thus, if a beneficiary's physician did not wish his or her patient to participate, the project never approached the beneficiary. However, consenting eligible beneficiaries could participate in the AdminaStar project even if their physician explicitly asked them not to.

AdminaStar had planned to enroll all beneficiaries at one time within about a month of mailing its project information. IFMC and Providence Hospital had planned to enroll beneficiaries over the first year of implementation. None of the projects was able to meet these goals. As a result of its initial mailing of 6,248 letters, AdminaStar had enrolled only 819 beneficiaries. To achieve its target of 1,100, the project performed a review of later Medicare claims, generated a second list of potentially eligible beneficiaries, and repeated the consent and verification process. IFMC and Providence Hospital both experienced much higher than expected refusal rates from beneficiaries and physicians (roughly 70 percent of eligible beneficiaries during the first year of the demonstration for both projects). After the first year, IFMC had enrolled 65 percent of its target of 800 and Providence Hospital had enrolled just 22 percent of its target of 1,500. As a result, HCFA extended the enrollment period for these two projects from one year to 18 months. In addition, in its application to continue funding into the second year of implementation, Providence Hospital lowered its enrollment target to 800.

4. Case Management

In addition to performing an initial assessment and periodic reassessment, case management for the demonstration primarily included providing condition-specific education and arranging for support services (such as transportation to medical appointments, financial assistance in purchasing medications, home-delivered meals, and homemaker services) or, under the direction of the patient's physician, medically oriented services (such as Medicare home health care or durable medical equipment). Case managers also provided emotional support to clients and their caregivers. Caseload size ranged from 74 clients per case manager at Providence Hospital to 100 at IFMC. The three projects varied in the relative emphasis placed on education and service arrangement, in part as a result of the needs of their clients and in part as a result of their vision of case management. For example, AdminaStar's project focused heavily on education. Project staff did not arrange for support services per se, but contacted local Area Agencies on Aging on behalf of clients, following up with the Area Agencies until services were in place. The Providence Hospital project focused on service arrangement and coordination, as well as patient advocacy; in this respect, it was most like a traditional long-term case management intervention. The focus of IFMC's project seemed to be midway between the other two along this education/service continuum.

None of the projects had made special arrangements with specific support service providers (such as homemaker or transportation providers). Because the projects were not able to purchase services themselves, however, such arrangements may not have been feasible. Thus, client access was hampered by waiting lists for services.

Each project recognized the importance of physician participation in case management and had planned to integrate case management with the efforts of client physicians. However, each found physicians to be less interested in the project than it had hoped. Initial physician indifference or antagonism toward the projects contributed to the high refusal rates among eligible beneficiaries at the IFMC and Providence Hospital projects. On the other hand, physicians whose patients became case management

clients appeared to be pleased with the service the project provided. Nevertheless, physicians never became part of the case management team.

The case management mode also varied among the three projects. AdminaStar case managers' contact with clients was by telephone exclusively. The IFMC case managers usually met potential clients while they were hospital patients; if they were randomly assigned to be clients while still in the hospital, the case manager sometimes would perform the initial assessment there. However, the project delivered most subsequent case management over the telephone, although case managers made home visits from time to time and occasionally accompanied clients to physicians' appointments. Most of the contact between Providence Hospital case managers and clients also was by telephone, although the case managers performed initial assessment and quarterly reassessments in the clients' homes. Thus, Providence Hospital's case managers had the highest level of in-person client contact.

AdminaStar's intervention was intended to last two years for each client; those of IFMC and Providence Hospital, one year. The disenrollment rate (for reasons other than death), at 17 percent, was highest for the two-year AdminaStar intervention, but only 2 percent and 8 percent for the one-year IFMC and Providence Hospital interventions, respectively. Client mortality rates during the intervention periods (as reported by the projects) ranged from 14 percent for Providence Hospital to more than 25 percent for AdminaStar and IFMC.

The demonstration projects were reimbursed monthly by HCFA for the costs of case management, up to the limits of their annual budgets. Client claims for regular Medicare covered services were paid by HCFA, as they would have been in the absence of the demonstration.

5. Effects of Demonstration Implementation Delay

HCFA initially expected that demonstration waivers would be effective July 1, 1993. However, the waivers were not approved until October 5 (effective October 1), 1993. The three-month delay led to a loss of momentum for staff that AdminaStar and IFMC had hired and trained in anticipation of the July

start. In addition, it led to credibility problems for IFMC, which had made arrangements with hospitals to begin referring in July and had made presentations to community physicians to enlist their support. Even though Providence Hospital had not hired staff in advance, the delay caused credibility problems with hospital physicians who had received extensive presentations to encourage referrals. On the other hand, the delay did allow time for additional preparation (for example, AdminaStar had more time to accumulate agency and provider lists for client referrals). On balance, however, the delay in wavier approval clearly had a negative effect on operations, at least for the first few months.

As a result of the delay and its effect on the start of case management services for the AdminaStar and Providence projects, HCFA extended the demonstration periods for these projects by two months--to November 30, 1995. (The period for IFMC ended, as initially planned, on September 30, 1995.)

D. OVERVIEW OF THE EVALUATION

Mathematica Policy Research, Inc., (MPR) was awarded a contract to evaluate the Medicare Case Management Demonstrations (HCFA 500-92-0011 [02], July 1993 to June 1997). The evaluation had four primary objectives: (1) to explain how the demonstration projects conducted case management; (2) to describe the types of individuals targeted and the level of participation achieved; (3) to estimate the impacts of case management on Medicare reimbursements, service utilization, and quality of care; and (4) to identify and critique alternative methods of paying for case management under Medicare.

To meet these objectives, the evaluation comprised four fully integrated analyses: (1) a case study to document the organization and operational processes of each of the projects; (2) a comparison of beneficiaries who chose to participate in the demonstration with those who declined; (3) an impact analysis to assess the extent to which demonstrations were able to reduce costs, affect utilization patterns, and improve access to and quality of care; and (4) recommendations for alternative methods of payment for case management in a fee-for-service environment. Because each project was unique, an essential element of the evaluation is the integration of the quantitative analyses with case study findings. With only three

projects, impact estimates would be of limited value if they were divorced from case study findings concerning the ability of the demonstration to identify an appropriate target population and the nature of the interventions.³

1. Data Sources

To support the four analytic tasks, the evaluation assembled and synthesized data from a variety of sources.

a. Site Visit Interviews and Project Document Review

Data collection for the evaluation included two sets of interviews with project staff and providers who had contact with project clients. The first round of interviewing comprised in-person site visits and took place at the start of the demonstration (December 1993 and January 1994). The second round of interviewing was also conducted in person, after demonstrations had been in effect for one year (October 1994 for all three projects). The third round of interviewing, which included only project staff, was conducted by telephone and took place in October and November 1995, at the conclusion of the two-year demonstration period.⁴

The project director for the evaluation also communicated regularly with project staff and reviewed a range of project documentation (for example, operating protocols, promotional literature, educational literature, staff meeting minutes, and project invoices to HCFA).

³For a detailed description of the original evaluation design, see Brown and Schore (1994).

⁴The first two rounds of interviewing included in-person and telephone interviews with providers who had contact with project clients (physicians, hospital discharge planners, and home health staff). The demonstration projects selected the providers we interviewed.

b. Demonstration Data

Projects maintained personal computer databases to track referred beneficiaries through eligibility verification and consent processes, to collect information on consenting eligible beneficiaries, and to document case management activities. The projects varied substantially in the type and amount of data entered, however, and this greatly complicated any cross-project comparisons. Furthermore, the extent to which the databases were integrated with case management functions varied among projects and thus may have affected database completeness or quality. For example, IFMC case managers used laptops to record all information and relied relatively little on hard-copy notes, while AdminaStar and Providence Hospital case managers relied primarily on hard copy and entered key information on databases afterward (or had an assistant enter the information).

The evaluation analyzed demonstration data to compare project enrollment and disenrollment patterns and to describe client characteristics and case management activities.

c. Medicare Eligibility and Claims Data

The evaluation analyzed Medicare eligibility data (for example, sex, race, and dates of birth and death) and claims data (describing service use and reimbursement) for all eligible beneficiaries. These data were used to:

- Compare eligible beneficiaries with all Medicare beneficiaries to assess whether demonstration target criteria identified populations with catastrophic health care costs
- Compare consenting and nonconsenting beneficiaries to assess whether the voluntary nature of the intervention resulted in relatively sicker or healthier clients
- Estimate impacts on service use and reimbursement during the demonstration

d. Six-Month Follow-Up Survey

The evaluation included a telephone survey of clients and control group members six months after random assignment to gather data on access to and quality of care, use of non-Medicare-covered services,

and clients' satisfaction with case management. The evaluation had the goal of completing interviews with 300 clients and 300 controls in each of the three projects and had planned to take proportional samples of each project to achieve this. Because of the difficulty IFMC and Providence Hospital had in meeting enrollment, however, all clients and control group members who enrolled in the projects were eligible for interview.

A total of 672 AdminaStar clients and control group members (or their proxies) completed interviews. Completed survey samples for IFMC and Providence Hospital were 715 and 411, respectively. The overall survey response rate was 91 percent; the response rate did not differ markedly for subsamples defined by treatment status or project.

2. Evaluation Reports

Two reports were prepared to present the findings of the evaluation. The first, the interim report (Schore et al. 1995), described the case management demonstration projects and their experiences during the first year of implementation, highlighting similarities and differences among the organization and operation of projects, discussing implementation problems and how they were addressed, and hypothesizing about the likely effects of project differences on impact estimates and project costs. The interim report was based primarily on information gathered during the first two rounds of site visits and on the review of project documents. This is the second and final evaluation report. It presents findings of analyses of targeting and participation, demonstration impacts, and the appropriateness of the demonstration payment mechanism. The analyses are based on Medicare, survey, and demonstration data. The report also updates descriptions of demonstration implementation with information gathered during the third round of case study interviews.

E. OVERVIEW OF THIS REPORT

Chapter II of this report describes projects' organization, targeting strategies, and enrollment procedures. Chapter III discusses case management activities and costs and client participation patterns. Chapter IV describes the data and statistical methodologies employed in the impact analyses. Chapters V and VI present the findings of analyses of the demonstrations' impacts on health-related service costs, service use, and the quality of care. Chapter VII summarizes the evaluation's findings and discusses alternative approaches to providing catastrophic case management in a fee-for-service environment.

II. PROJECT ORGANIZATION, TARGETING, AND ENROLLMENT

The hosts for the three Medicare Case Management (MCM) projects differed markedly in how they organized and staffed the demonstration projects, the target criteria they chose to identify potential clients, and the manner in which they implemented target criteria. For example, medical director involvement ranged from intermittent and minimal to ongoing and substantial. The relative use of nurses and social workers in case management also differed across projects. All three projects appeared to be successful in identifying beneficiaries likely to have high rates of Medicare service use and reimbursement during the intervention period. For example, project control group members were nearly three times as likely as other Medicare beneficiaries in each state to have a hospital admission during the year following random assignment. However, screening ongoing hospital admissions appeared to have been less efficient than claims review for identifying eligible beneficiaries, and each project met with unexpected resistance to case management from beneficiaries and their physicians. Only between 11 and 22 percent of beneficiaries initially identified as potentially eligible for each project actually were eligible and consented to participate in the demonstration.

This chapter describes the organization and goals of the demonstration projects, the targeting criteria and procedures for their implementation, and the resulting populations of consenting eligible beneficiaries. (Table II.1 presents an overview of these project features.)

A. ORGANIZATION AND GOALS

Three diverse organizations hosted the MCM Demonstration projects. AdminaStar Solutions (Indianapolis, Indiana) hosted the Patients Assisted to Healthy Hearts (PATH) project. AdminaStar was the government business holding company of Associated Insurance Companies, Incorporated (AICI). AICI company operations included traditional health insurance, managed care, investment banking, and market research. AdminaStar was formed in 1990 to market administrative services to government agencies and

TABLE II.1

HOST ORGANIZATIONS AND TARGET POPULATIONS OF MEDICARE CASE MANAGEMENT PROJECTS

Demonstration Host Organization	Previous Case Management Experience	Project Goals	Target Population and Screening Procedures
AdminaStar Solutions Indianapolis, Indiana Part of the government business holding company of Associated Insurance Companies, Incorporated	Case management for Indiana and Iowa uninsured risk pools for beneficiaries with catastrophic or chronic illnesses Private case management for HMOs and PPOs	Determine feasibility of using claims to identify beneficiaries with CHF who would benefit from case management Investigate effects of case management on costs and outcomes Improve outcomes and reduce costs through education and support	Elderly beneficiaries with CHF as identified by review of Medicare hospital claims DRGs. Must reside and receive care in Indiana. Beneficiaries with certain comorbid conditions excluded. Beneficiaries solicited through mass mailing to those potentially eligible. Consenting beneficiaries then verified eligible by telephone. No physician consent required. Planned treatment group size: 550
Iowa Foundation for Medical Care (IFMC) West Des Moines, Iowa Iowa and Nebraska Peer Review Organization	Case management for private insurance enrollees with catastrophic illnesses	Develop alternative, cost-effective approach to treating CHF and COPD within current Medicare fee-for-service payment system without jeopardizing quality Reduce hospital admissions	Elderly or disabled beneficiaries with CHF or COPD admitted to 1 of 10 participating hospitals in Des Moines, western Iowa and eastern Nebraska Beneficiaries primarily contacted while hospitalized if chart review verified eligibility and physicians gave consent; others identified by Medicare hospital claims review. Planned treatment group size: 400
Providence Hospital Southfield, Michigan Tertiary-care teaching facility, member of Daughters of Charity National Health System	In-hospital case management for high-risk patients	Test screening guidelines to identify beneficiaries at risk of frequent hospitalization Improve health and reduce hospitalizations and medical crises Develop comprehensive database on eligible beneficiaries	Elderly beneficiaries with CHF, COPD, ischemic heart disease, pneumonia/sepsis, nutritional/metabolic problems, stroke, cancer, major joint replacement. Must be Providence Hospital patient of physician on staff and have prognosis of at least six months. Beneficiaries primarily contacted while hospitalized if chart review verified eligibility and physicians gave consent; others referred directly by physicians Planned treatment group size: 750 (reduced in second-year continuation application to 400)

CHF = Congestive heart failure
 COPD = Chronic obstructive pulmonary disease
 HMO = Health maintenance organization
 PPO = Preferred provider organization
 DRG = Diagnose-related group

organizations conducting government contracts. The Iowa Foundation for Medical Care (IFMC) (West Des Moines, Iowa), the host for the Catastrophic Case Management (CCM) project, was the Iowa Peer Review Organization (PRO). The review program for Nebraska was conducted by the Sunderbruch Corporation, a wholly owned subsidiary of IFMC. As PRO, IFMC reviewed the appropriateness of acute- and long-term care admissions and performed level-of-care determinations for home- and community-based services provided under Medicaid waivers. Providence Hospital (Southfield, Michigan), the host of the Geriatric Case Management (GCM) project, was a 462-bed teaching hospital in a suburb of Detroit and a member of the Daughters of Charity National Health System, the largest not-for-profit health care system in the United States at the time of the demonstration. The hospital included a home health agency, a large ambulatory diagnostic and surgical center, primary care clinics, and a nursing home; it also provided adult day care, caregiver respite, geriatric psychiatric services, and community-based rehabilitation.

The host organizations' prior case management and related experiences shaped their vision of case management for the demonstration projects. AdminaStar had provided case management for individuals in the Indiana and Iowa uninsured risk pools who had catastrophic and chronic illnesses. At the time of the demonstration, AdminaStar also provided cost containment services for preferred provider organizations and health maintenance organizations (HMOs) with a total of 750,000 enrollees. In addition, AdminaStar provided claims review-based cost containment and quality assurance services for Medicare carriers in five states. IFMC, in addition to its PRO activities, provided case management for a large Midwestern manufacturer's employees who had catastrophic illnesses or who were undergoing unusual treatment. Case management was conducted by telephone and included the authority to purchase services not routinely covered by the employer-furnished insurance plan. Providence Hospital and, more broadly, the Daughters of Charity, had a longstanding mission to provide care for the poor and elderly. The hospital

provided in-house case management to certain groups of patients who had complicated medical problems that required care coordination across disciplines and hospital departments.

The three projects shared the goal of using case management to improve client health, and thereby reduce total medical expenses, especially for costly inpatient care. In addition, AdminaStar had the goal of testing the feasibility of using Medicare claims data to identify beneficiaries with congestive heart failure (CHF) who would be likely to benefit from case management. Similarly, Providence Hospital sought to test the efficacy of their screening guidelines in identifying elderly individuals at risk of repeat hospitalizations and to develop a comprehensive database describing eligible beneficiaries.

The types of staff each project employed differed somewhat. In the AdminaStar and IFMC projects, all the case managers and project directors were nurses. (AdminaStar employed six full-time-equivalent case managers and a case manager supervisor; IFMC employed four full-time-equivalent case managers, with the project director acting as supervisor.) AdminaStar also employed a part-time social worker who coordinated case manager referrals for support services for their clients. Providence Hospital employed three case managers and a case manager supervisor. Two of the case managers were nurses; the third case manager and the supervisor were social workers. The Providence Hospital project director had served as an administrator within the hospital for a number of geriatric initiatives.

The intensity of medical direction also varied across projects. AdminaStar's medical director was a pediatrician, whose primary responsibilities were to assist the project director in developing the project's operational protocol, to design a computer system to track the client-screening efforts and to perform random assignment, and to field medical questions from case managers. When the project was fully operational, he was spending roughly four hours a month on the project. (AdminaStar also had a consulting agreement with a cardiologist who met monthly with the case managers to provide ongoing training.) IFMC's medical director was a family practitioner in a large group practice and an associate medical director for the PRO. He also spent roughly four hours a month on the project, primarily to answer

questions from case managers about the application of project eligibility criteria to specific beneficiaries. The Providence Hospital medical director, a geriatrician and chair of the hospital's family practice department, was the most intensely involved of the three directors. When the project was fully operational, she was spending four *days* a month on the project, primarily providing clinical supervision to the case managers. (She had also written the hospital's project proposal.)

B. TARGETING AND ELIGIBILITY PROCEDURES

Each project identified its target population on the basis of medical diagnosis, usually for a chronic condition historically associated with a high rate of hospital readmission. In addition, to be eligible for the demonstration more generally, a beneficiary must have had Medicare Parts A and B coverage and must not have been enrolled in an HMO. In contrast to some HMO- and hospital-based interventions, none of the projects targeted beneficiaries on the basis of the beneficiaries' previous levels of hospital use or level of functional impairment or whether they had multiple health problems.

1. AdminaStar

AdminaStar chose just one diagnosis, CHF, excluding beneficiaries with CHF who also had comorbid conditions associated with substantial costs of their own (for example, serious kidney failure) or comorbid conditions that would make its education-focused intervention impractical (for example, Alzheimer's disease). AdminaStar selected CHF because of its high prevalence, treatment costs, and morbidity and mortality rates. In addition, AdminaStar believed there were recent advances in the treatment of CHF with which most primary physicians were unfamiliar (for example, the use of ACE inhibitors).¹ It planned to recruit 1,100 eligible beneficiaries who, additionally, were residing and receiving medical care throughout Indiana and were at least 65 years old. One-half of these beneficiaries would be offered case management.

¹ACE inhibitors were a relatively new classification of medications that increase the pumping action of the heart by relaxing blood vessels.

As a result of their familiarity with and access to Medicare claims data (as Medicare fiscal intermediary and carrier for Indiana), AdminaStar chose to identify potentially eligible beneficiaries by reviewing Medicare claims with service dates between September 1992 and August 1993. In October 1993, it sent material describing the project and a consent form to each beneficiary who had a Medicare claim for a recent hospitalization for CHF (but who did not fall into an excluded category). Project staff members then telephoned beneficiaries to verify their eligibility, calling those who returned the consent form and who had expressed interest in participating by signing it.

AdminaStar had initially planned to identify targeted beneficiaries by using a single review of claims and subsequent mailing. However, an initial mailing to 6,248 beneficiaries yielded only about three-quarters of their target. To bring enrollment up to the target, the staff repeated the selection process, reviewing Medicare claims for services between September and December 1993, and sending project information packets to another 1,754 beneficiaries in February 1994. Of the 8,002 beneficiaries who were identified as potentially eligible by the two claims reviews, 1,134 (14 percent) consented to participate and were subsequently verified as eligible for the PATH project.² (See Table II.2.)

2. Iowa Foundation for Medical Care

IFMC limited its project to beneficiaries with a diagnosis of either CHF or chronic obstructive pulmonary disease (COPD). IFMC selected CHF and COPD because they are among the 10 most frequent Medicare discharge diagnoses and because individuals with these conditions have some of the highest costs and rates of hospital readmission. On the basis of its private case management experiences, IFMC believed the project could produce cost savings for these populations. The IFMC project was the only one that accepted permanently disabled beneficiaries under the age of 65. It planned to recruit 800

²Some of the nonparticipants may have been deceased or otherwise ineligible for the demonstration at the time of the mailings. This possibility is exacerbated by the fact that they were identified by hospital stays occurring as long as a year prior to the invitation to participate.

TABLE II.2
PROJECT SCREENING AND ENROLLMENT

	AdminaStar	IFMC	Providence Hospital
Number of Potentially Eligible Beneficiaries Identified	8,002	3,628	4,135
Number of Beneficiaries Verified as Eligible	NA	2,537	1,674
Percentage Verified Eligible	NA	69.9	40.5
Number of Consenting Eligible Beneficiaries	1,134	806	442
Percentage Consenting Eligibles of all Potentially Eligible	14.2	22.2	10.7
Percentage Consenting Eligibles of all Verified Eligible	NA	31.8	26.4
Target Number of Consenting Eligibles Beneficiaries	1,100	800	800*
Percentage of Target Enrolled	103.1	100.8	55.3

SOURCE: AdminaStar's Patients Assisted to Healthy Hearts (PATH) database, IFMC's Catastrophic Case Management (CCM) database, and Providence Hospital's Geriatric Case Management (GCM) database.

NOTE: AdminaStar verified eligibility following beneficiary consent to participate. Thus, some entries in this table are not applicable (NA). (Among the 1,272 beneficiaries who expressed interest in participating in the AdminaStar project, 11 percent were later found to be ineligible.) IFMC and Providence Hospital verified eligibility before beneficiary consent.

AdminaStar enrolled consenting eligible beneficiaries at two points in time: December 17, 1993, and April 15, 1994. IFMC enrolled beneficiaries between October 1993 and March 1995, inclusive. Providence Hospital enrolled beneficiaries between December 1993 and May 1995, inclusive.

*Providence Hospital reduced its target enrollment from 1,500 to 800 in its second-year continuation application.

NA = not applicable.

consenting eligible beneficiaries residing in Des Moines, western Iowa, and eastern Nebraska (400 of whom were to be offered case management).

IFMC identified beneficiaries primarily through the review of ongoing hospital admissions for targeted diagnoses and, whenever possible, contacted beneficiaries while they were still hospitalized. IFMC had memoranda of understanding with 10 hospitals to refer any Medicare-covered patients admitted with probable CHF and COPD. Project staff members then went to the hospital to verify the eligibility of each referred patient through chart review using a set of rigorous clinical criteria developed for the project to maximize the accuracy and reliability of the verification. If a patient was found to be eligible (and if the patient's physician gave permission), the case manager then presented the project to the patient.

About six months into the enrollment period, which began in October 1993, the project staff noticed that several hospitals were not making the expected number of referrals. When letters and telephone calls to the hospitals did not increase referrals substantially, the project developed a process to identify potentially eligible beneficiaries from Medicare hospital claims, to which IFMC had access as part of its PRO activities. At the end of the enrollment period (March 1995), IFMC had identified 3,628 potentially eligible beneficiaries through hospital referrals and claims review. Of those, 2,537 (70 percent) were verified as eligible. Among beneficiaries verified as eligible, 13 percent had been identified by claims review. IFMC reached its enrollment target, with 806 eligible beneficiaries participating (22 percent of those initially screened).

3. Providence Hospital

Providence Hospital targeted eight diagnostic groups: (1) CHF, (2) COPD, (3) ischemic heart disease, (4) stroke, (5) pneumonia and sepsis, (6) major joint replacement, (7) nutritional and metabolic problems (including diabetes, dehydration, and decubitus ulcers), and (8) cancer. A review of two years of Providence Hospital admissions revealed that patients with these diagnoses had both above-average risks of readmission and readmissions that potentially could be prevented by case management. The project also targeted nonhospitalized beneficiaries who met slightly different diagnostic criteria and who

were referred by their physicians. Additional eligibility criteria for all beneficiaries included being age 65 or older, having a primary physician affiliated with Providence Hospital, living within 25 miles of the hospital, and having a prognosis of at least six months to live. The hospital planned to recruit 1,500 consenting eligible beneficiaries, of whom one-half would be offered case management.

The project ultimately dropped the cancer target group because the hospital had developed a separate case management program for cancer patients and because, in practice, most beneficiaries with cancer who were admitted to the hospital did not meet the six-month prognosis criterion. It considered changing or deleting the nutritional/metabolic problem group because it was not well defined, which made the identification of beneficiaries difficult. In addition, the project found that people with diabetes were seldom admitted to the hospital with a principal diagnosis of diabetes; a diagnosis for some complicating problem was more common. However, no changes were made to the eligibility criteria for this target group.

Providence Hospital, like IFMC, identified beneficiaries primarily through the review of ongoing hospital admissions. Beginning in December 1993, project staff personally reviewed the Providence Hospital admissions logs daily for potentially eligible patients. (Former hospital patients, the community referral target group, were referred to the project by their physicians.) Staff then verified eligibility through chart review and presented the project to eligible patients if their physicians gave permission to do so. By the end of the enrollment period (May 1995), the project had identified a total of 4,135 patients by using this process, but only 1,674 (41 percent) were verified as eligible. Chart review primarily disqualified beneficiaries because the admitting diagnosis was inaccurate. The project director noted that more patients than anticipated were disqualified because they lived out of the area or did not have a primary care physician on the Providence Hospital staff. (In preparing its enrollment target, the project had underestimated the number of patients who came to the hospital for specialty care.) In addition, nearly a quarter of the potentially eligible beneficiaries were discharged either before the case manager could perform a chart review or before physicians gave permission for the case managers to present the project to them. Response to the project's mail solicitations to these beneficiaries was poor, and project staff did

not have time to follow up with them once they left the hospital. Only a few beneficiaries were disqualified because they had no Medicare Part B coverage or because of language problems.

Ultimately, Providence Hospital fell short of its revised target of 800 enrollees in the demonstration. Only 442 (26 percent of the 1,674 eligible beneficiaries and 11 percent of those initially screened) agreed to participate.

4. Comparison of Medicare Service Use of Project Eligibles and All Medicare Enrollees

The demonstration projects sought to develop targeting criteria and procedures for their implementation that would identify beneficiaries who would have catastrophic health care costs during the demonstration period. The projects appeared to have been successful in this regard, as reflected in Table II.3. Eligible beneficiaries in each project were nearly three times as likely as the general population of beneficiaries in each of their states to have a hospital admission during the year after enrollment in (or refusal of) the demonstration.^{3,4} Among those who were hospitalized, mean Medicare reimbursement

³Project study group sizes for Table II.3 are: 5,753 for AdminaStar, 2,308 for IFMC, and 1,589 for Providence Hospital. The AdminaStar group includes all beneficiaries identified by the project as potentially eligible. Because AdminaStar verified eligibility after obtaining beneficiary consent, a study group of eligible beneficiaries (containing consenters and nonconsenters), available for the other two projects, does not exist for AdminaStar. All project study groups include clients, whose service use may have been affected by the demonstration. IFMC and Providence Hospital data may be incomplete for beneficiaries with consent dates after 1994 (21 percent of IFMC eligibles and 26 percent of Providence Hospital eligibles) and, thus, likely *understate* differences between project eligibles and the general Medicare population. All project study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files. Clients and control group members who died prior to random assignment are also excluded, as are 2,146 AdminaStar potential eligibles who died before the random assignment date of their respective enrollment wave.

⁴The period of observation for AdminaStar is the year following December 17, 1993 for the first wave of identified beneficiaries and is the year following April 15, 1994 for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for consenting eligible beneficiaries in the IFMC and Providence Hospital projects is the year following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the year following the day after hospital discharge if the beneficiary was randomized while in the hospital. (We defined reference periods this way because, in practice, case management did not begin until a client's seminal hospitalization was over. Thus, the costs of that hospitalization were counted as predemonstration costs.) For nonconsenting eligibles in the IFMC and Providence Hospital projects, the observation period is the year following the date of refusal.

TABLE II.3

**MEDICARE SERVICE USE AND REIMBURSEMENT DURING THE FIRST DEMONSTRATION YEAR
BY PROJECT-ELIGIBLE BENEFICIARIES COMPARED WITH ALL BENEFICIARIES IN 1994**

	Beneficiaries Potentially Eligible for AdminaStar Project	All Indiana Beneficiaries	Beneficiaries Eligible for IFMC Project	All Iowa Beneficiaries	All Nebraska Beneficiaries	Beneficiaries Eligible for the Providence Hospital Project	All Michigan Beneficiaries	All United States Beneficiaries
Inpatient Hospital								
Percentage Receiving Care	55.0	20.9	56.3	19.9	17.9	54.8	20.1	19.3
Average Reimbursement per Recipient (Dollars)	9,736	8,946	10,721	7,709	8,336	14,659	10,949	10,207
Skilled Nursing Facility								
Percentage Receiving Care	14.3	3.9	17.5	3.6	3.7	16.2	2.8	3.0
Average Reimbursement per Recipient (Dollars)	6,185	6,220	4,770	3,396	3,514	6,042	3,802	5,528
Home Health								
Percentage Receiving Care	30.9	8.0	37.5	7.0	6.6	56.6	8.8	9.4
Average Reimbursement per Recipient (Dollars)	4,556	4,000	3,286	2,280	2,566	4,047	3,285	4,016
All Medicare Services								
Average per Enrollee (Dollars)	10,063	3,945	11,882	3,080	2,926	15,970	4,307	4,375

SOURCE: State and United States data for 1994 from *Medicare and Medicaid Statistical Supplement, 1996*, and personal communication with HCFA Office of Research and Demonstrations staff. Data describing the demonstration project samples are from the 1993 through 1995 National Claims History files.

NOTE: Study group sizes of project-eligible beneficiaries are: 5,753 for AdminaStar; 2,308 for IFMC; and 1,589 for Providence Hospital. The AdminaStar study group includes all beneficiaries identified by the project as potentially eligible. Because AdminaStar verified eligibility after obtaining beneficiary consent, a group of eligible beneficiaries (containing consenters and nonconsenters), available for the other two projects, does not exist for AdminaStar. All project study groups include clients, whose service use may have been affected by the demonstration. IFMC and Providence Hospital data may be incomplete for beneficiaries with consent dates after 1994 (21 percent of eligible beneficiaries for IFMC and 26 percent for Providence Hospital) and may understate differences between project eligibles and the general Medicare population. All project study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files. Clients and control group members who died prior to random assignment are also excluded, as are 2,146 AdminaStar potential eligibles who died before the random assignment date of their respective enrollment wave.

TABLE II.3 (continued)

The period of observation for AdminaStar is the year following December 17, 1993, for the first wave of identified beneficiaries and is the year following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for consenting eligible beneficiaries in the IFMC and Providence Hospital projects is the year following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral) but the year following the day after hospital discharge if the beneficiary was randomized while in the hospital. For nonconsenting eligibles in the IFMC and Providence Hospital projects, it is the year following the date of refusal. Beneficiary identification and random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

All project percentages and means are statistically significantly different from their respective state means (at the .05 level using a two-tailed test) except skilled nursing facility reimbursements for AdminaStar compared with Indiana.

ranged from 9 percent higher for AdminaStar project eligibles than for other Indiana beneficiaries to roughly 25 percent higher for IFMC and Providence Hospital eligibles than for other Medicare beneficiaries in their states. This suggests project eligibles also had more hospital admissions or were hospitalized for more costly Diagnosis-Related Groups (DRGs) than others.

Rates of skilled nursing facility (SNF) and home health use were also much higher for project-eligible beneficiaries than for beneficiaries more generally. For example, roughly six times as many beneficiaries eligible for the Providence Hospital project received care in an SNF or care from a home health agency during the first year of the demonstration as did Michigan beneficiaries more generally. Similarly, mean reimbursement per user was higher for project-eligible beneficiaries than for others in their respective states.⁵

C. CONSENT PROCEDURES AND CHARACTERISTICS OF CONSENSERS

1. Consent Procedures

Each project developed its own consent forms; these forms described project parameters, including the use of random assignment to case management or regular Medicare services. The forms were presented to beneficiaries, along with other written material describing the project. Case managers at IFMC and Providence Hospital presented the consent forms to eligible beneficiaries after providing a verbal description of the project. This presentation usually was made while the beneficiaries were hospitalized with the stay that identified them as potentially eligible for the project. (Potentially eligible beneficiaries for the AdminaStar project received consent forms and descriptive material in the mail.)

In addition to requiring informed consent to participate from beneficiaries, IFMC and Providence Hospital also required consent from the beneficiary's primary physician. In fact, these projects obtained consent from physicians *before* approaching beneficiaries. Thus, if a physician did not wish his or her

⁵All project percentages and average dollars were statistically different from their respective state means, except those for SNF reimbursements for the AdminaStar project.

patient to participate, project staff never approached that individual. In contrast, a consenting eligible beneficiary could participate in the AdminaStar project even if the beneficiary's physician explicitly asked the beneficiary not to do so. AdminaStar did not notify a patient's physician until after the beneficiary had agreed to participate and was found to be eligible for its project.

Consent rates among beneficiaries verified as eligible for the IFMC and Providence Hospital projects were 32 and 26 percent, respectively (see Table II.2). As noted, AdminaStar verified eligibility after beneficiaries gave consent. As a result, no similar statistic exists for that project. However, 14 percent of beneficiaries potentially eligible for the AdminaStar project consented to participate and were then verified eligible. Comparable statistics for IFMC and Providence Hospital were 22 and 11 percent, respectively.

Rates of refusal were much higher than projects expected. Providence Hospital had anticipated a refusal rate of 20 percent. IFMC had expected a maximum refusal rate of 65 percent. After a year of operations, both as a result of lower than expected rates of eligibility verification and higher than expected rates of refusal, IFMC had identified only 518 consenting eligible beneficiaries and Providence Hospital only 330 (65 and 22 percent of their original enrollment targets, respectively). As a result, HCFA extended the enrollment period for these projects by six months.⁶ In addition, in its application for second-year funding, Providence Hospital lowered its enrollment target from 1,500 to 800 beneficiaries. At the end of 18 months of enrollment, IFMC had made its target with six beneficiaries to spare, but Providence Hospital, with only 441 consenting eligible beneficiaries, had only 55 percent of its target. As noted, AdminaStar also expected a much higher consent rate from its initial mailing to potentially eligible beneficiaries. (The project found verification rates among consenting beneficiaries of just under 90 percent to be within their expectations.) However, the low consent rate caused the project to produce a second

⁶HCFA did not extend demonstration operations waivers beyond the original two years. Thus, beneficiaries who enrolled and were randomized to the treatment group during the six-month extension period (36 percent of the IFMC treatment group and 21 percent of the Providence Hospital treatment group) received case management for less than a year.

mailing, which ultimately brought them to slightly above their enrollment target, with 1,134 consenting eligible beneficiaries.

Reasons for the high refusal rates varied across the three projects. Among the 8,002 beneficiaries identified as potentially eligible for the AdminaStar project, 48 percent never responded to project mailings, implying nonconsent or ineligibility. Another 15 percent returned the consent form, explicitly saying that they did not wish to participate. Unlike the other two projects, AdminaStar had no contact with beneficiaries who refused to participate (either implicitly or explicitly). Thus, we have no information on particular reasons for refusal for that project.

Among the 1,731 beneficiaries verified as eligible for the IFMC project but who refused to participate, nearly two-thirds of the refusals came from physicians refusing for their patients, while one-third came from beneficiaries who declined to participate after their physicians gave case managers permission to approach them. (These fractions were similar for beneficiaries with CHF or COPD.) The project, as well as providers who worked with project clients, attributed the high physician refusal rate to the “punitive” reputation (stemming from its PRO role) that IFMC had among physicians at that time. In addition, most physicians initially learned about the project through presentations the project director (a nurse) made at the 10 referring hospitals and informal discussions with her at meetings of physicians that had a purpose other than the promotion of the project. In retrospect, the medical director believed that physicians would have been more receptive if the project had engaged “opinion leaders” among physicians at each hospital to speak on its behalf. The medical director also believed that some physicians generally feared loss of control over their patients’ care if those patients received case management.

Beneficiaries who declined to participate in the IFMC project gave a variety of reasons to the case managers who approached them. Some feared that case management would lead to a loss of services (as they have come to expect from case management from insurance companies), although they were assured it would not. Others felt they did not need case management because they routinely had home health services following hospitalization, they wished their spouses to be responsible for all caregiving, or they

did not want a case manager interfering in their lives. (Random assignment did not seem to be of concern to beneficiaries and was not given as a reason for refusal.)

Among the 1,232 eligible beneficiaries who declined to participate in the Providence Hospital project, roughly a quarter of the refusals were because physicians refused for their patients, compared with three-quarters of beneficiaries who declined after physicians gave the project permission to approach them. (These proportions differed for beneficiaries with ischemic heart disease, the project's largest target group. Among beneficiaries in that group, nearly 40 percent of all refusals were from physicians.) After one year of project operation, staff suggested several reasons why physicians refused to let their patients participate. Some physicians believed their patients either were too frail or unstable or were too independent to benefit from case management. Staff thought this type of prejudgment was a particular problem among cardiologists, as perhaps reflected in the higher than average physician refusal rate among beneficiaries with ischemic heart disease. Other physicians feared that "research on a patient" would interfere with their rapport with the patient. Some did not approve of the use of random assignment in the demonstration. Physician acceptance of the project appeared to increase over time, however. After the first 9 months of enrollment, the physician refusal rate was 31 percent; over the full 18-month enrollment period, it was 25 percent.

Beneficiary refusals were a larger problem for the Providence Hospital project than physician refusals. Roughly a third of refusing beneficiaries did so implicitly, having been discharged from the hospital after being verified eligible, but never responding to the project's offer to participate. Reasons for explicit refusal given by beneficiaries were largely similar to those given to the IFMC project, including perceived lack of need or mistrust of the project. A number of beneficiaries found that having one more form to sign while hospitalized was too overwhelming. Simply getting out of the hospital and arranging for immediate postacute care were higher priorities than deciding whether to get involved with case management. Again, project staff did not think that random assignment deterred beneficiaries from consenting.

2. Comparisons of Refusers and Consenters

Targeting criteria and eligibility verification procedures succeeded in identifying a sector of the Medicare population with substantially higher than average Medicare expenditures. Because the case management demonstrations were voluntary, however, the question arises as to what types of eligible beneficiaries found case management attractive. For example, were eligible beneficiaries with relatively high costs less likely to participate than those with lower costs? This could occur if the beneficiaries with higher costs were too ill and, thus, less able to cope with any change in routine that they perceived would be involved with participating. Alternatively, beneficiaries with relatively lower costs may have felt case management was unnecessary for them and, therefore, might have been more likely to decline than beneficiaries with greater need.

To address this question, we first compared Medicare eligibility information, service use, and reimbursement patterns during the year prior to the date of the enrollment decision for eligible beneficiaries who chose to participate and were later randomly assigned to the client or control group (“consenters”) with eligible beneficiaries who declined to participate (“refusers”).⁷ (Table II.4 compares selected characteristics of these two groups for each project.) Consenters at all three projects tended to be younger than refusers. For example, roughly 15 percent of consenters (compared with between 22 and 29 percent of refusers) were age 85 or older. Consenters at AdminaStar and Providence Hospital were more likely than refusers to be nonwhite, although at IFMC equal percentages of consenters and refusers were nonwhite. Slightly smaller percentages of consenters than refusers at AdminaStar and Providence Hospital

⁷As a result of AdminaStar verifying eligibility following beneficiary consent, the comparison for AdminaStar was between consenting eligible beneficiaries and potentially eligible beneficiaries exclusive of consenting eligibles.

TABLE II.4

CHARACTERISTICS OF REFUSING AND CONSENTING ELIGIBLE BENEFICIARIES DURING THE YEAR BEFORE ENROLLMENT DECISION

	AdminaStar		IFMC		Providence Hospital	
	Refusers	Consenters	Refusers	Consenters	Refusers	Consenters
Percentage Age 85 or Older at Time of Enrollment Decision	28.5***	14.0	21.9***	16.8	23.1***	16.9
Percentage Nonwhite	5.6***	8.0	3.9	3.7	17.6***	25.2
Percentage with Medicaid Buy-In for Medicare A or B	15.0***	9.4	10.2*	13.0	5.7**	3.3
Percentage Receiving Medicare Services During Year Prior to Enrollment Decision						
Inpatient hospital	90.1	89.6	99.7	99.9	98.9***	92.1
Skilled nursing facility	15.7***	6.7	13.2	12.2	11.6***	7.4
Home health	34.6***	29.8	29.9	28.0	35.6	37.1
Inpatient admission that included an emergency room visit	66.5*	63.7	69.2	69.6	72.7**	66.4
Outpatient emergency room visit	36.1**	32.3	34.7	36.1	32.8	30.2
Mean Medicare Reimbursement During Year Prior to Enrollment Decision (Dollars) ^a						
Part A	10,620***	8,972	11,584	11,231	13,368**	11,679
Part B	2,626	2,749	3,924	3,963	4,625	4,496
Total	13,246***	11,722	15,508	15,194	17,993**	16,175
Number of Observations	4,641	1,112	1,569	739	1,169	420

SOURCE: Birth date, race, and Medicaid buy-in status are from the Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996. Service use and reimbursement data are from the 1992 through 1995 National Claims History files.

NOTE: AdminaStar refusers include all potentially eligible beneficiaries who did not become consenting eligible beneficiaries; IFMC and Providence Hospital refusers are eligible beneficiaries who did not consent to participate in the demonstration. Consenters for all projects include treatment and control group members.

All project study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files. Clients and control group members who died prior to random assignment are also excluded, as are 2,146 AdminaStar refusers who died before the random assignment date of their respective enrollment wave.

The period of observation for AdminaStar is the year before December 17, 1993, for the first wave of identified beneficiaries and is the year before April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for consenting eligible beneficiaries in the IFMC and Providence Hospital projects is the year before the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the year before the day after hospital discharge if the beneficiary was randomized while in the hospital. For nonconsenting eligibles in the IFMC and Providence Hospital projects, it is the year before the date of refusal. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

^a We also compared distributions of beneficiaries across these reimbursement levels (below the 25th percentile, between the 25th and 75th percentiles inclusive, and above the 75th percentile) because participation rates of beneficiaries at the low and high ends of the distribution might be different from the rates of those in the middle. Such differences could be obscured by comparisons of mean reimbursement. However, consistent with the observation of higher mean total reimbursement for refusers at the AdminaStar and Providence Hospital projects, refusers in these two projects were more likely than consenters to have with reimbursements above the 75th percentile. No differences in this distribution were observed for IFMC consenters and refusers.

TABLE II.4 (continued)

*Significantly different from zero at the .10 level, two-tailed comparison of means test.

**Significantly different from zero at the .05 level, two-tailed comparison of means test.

***Significantly different from zero at the .01 level, two-tailed comparison of means test.

were receiving Medicaid (as indicated by a Medicare buy-in flag on the Health Insurance Skeleton Eligibility Write-Off [HISKEW] file). Medicare beneficiaries who were also receiving Medicaid benefits might have felt they already had access to the types of services the case management demonstrations planned to provide or arrange. However, at IFMC, a slightly higher percentage of consenters than refusers were receiving Medicaid.

Rates of inpatient hospital use during the predemonstration year (at 90 percent or higher for all groups as a result of the project eligibility criteria) were almost equal for consenters and refusers in the AdminaStar and IFMC projects. This rate was lower for Providence Hospital consenters than refusers because of a markedly higher consent rate among the project's community referral target group, for whom a recent prior hospital stay was not required. Rates of all types of Medicare service use and levels of total reimbursement were roughly equivalent for consenters and refusers at the IFMC project. At the AdminaStar and Providence Hospital projects, however, use rates for most types of services and total reimbursements were higher for refusers than for consenters. For example, 16 percent of AdminaStar refusers (compared with only 7 percent of consenters) had an SNF admission during the predemonstration year. AdminaStar refusers also were more likely than consenters to use home health care, have an inpatient stay that started with an emergency room admission, or have at least one outpatient emergency room visit. As a result, refusers also had higher Part A and total reimbursement levels. In contrast, levels of Part B reimbursement were roughly equivalent.* Similar differences were also apparent for Providence Hospital refusers and consenters, except that the percentages of consenters and refusers using home health care

*We also compared distributions of beneficiaries across reimbursement levels (below the 25th percentile for all refusers and consenters combined, between the 25th and 75th percentiles inclusive, and above the 75th percentile) because participation rates of beneficiaries at the low and high ends of the distribution might be different from the rates of those in the middle. Such differences could be obscured by comparisons of mean reimbursement. However, consistent with the observation of higher mean total reimbursement for refusers at the AdminaStar and Providence Hospital projects, a higher percentage of refusers than consenters had reimbursements above the 75th percentile. At the Providence Hospital project, a lower proportion of refusers had reimbursements below the 25th percentile. At the AdminaStar project, however, there was no difference in percentages below the 25th percentile. No differences in this distribution were observed for IFMC consenters and refusers.

were equivalent. If Part A service use is viewed as a proxy for beneficiary severity of illness or level of acuity, then refusers tended to be more ill than consenters during the year before enrollment at the AdminaStar and Providence Hospital projects, but did not differ in this way at the IFMC project.

We also compared refusers and those consenters randomly assigned to the control group during the six months following the enrollment decision (see Table II.5). As would be expected with random assignment, comparisons between refusers and control group members on age, race, and Medicaid enrollment yielded findings similar to those observed when comparing refusers to all consenters (that is, clients and control group members together). During the six months after their enrollment decision, refusers had higher mortality rates, consistent with the finding that refusers tended to be older than control group members. Beneficiaries with terminal illness, however, might have been less likely to participate regardless of their age.

No clear patterns of Medicare service use and reimbursement during the six months after the enrollment decision emerged from refuser/control group comparisons. For the AdminaStar and Providence Hospital projects, the comparisons were similar to those for the predemonstration year. Refusers had higher rates of use of most types of services, although hospitalization rates were roughly equal. A notable exception was the lower rate of home health use among Providence Hospital refusers relative to control group members. Mean reimbursement levels were roughly equivalent (as were distributions of refusers and control group members across reimbursement levels).⁹ We had observed no difference between refusers and consenters at the IFMC project during the predemonstration. During the six months following the enrollment decision, however, control group members had higher rates of use of most types of services

⁹Providence Hospital control group members appeared to have a slightly higher mean Part A reimbursement despite having lower hospital and SNF use rates. This occurred both because control group members had a markedly higher home health use rate and because a few control group members had unusually high inpatient reimbursements.

TABLE II.5

CHARACTERISTIC 3 OF REFUSING BENEFICIARIES AND CONTROL GROUP MEMBERS DURING THE SIX MONTHS FOLLOWING ENROLLMENT DECISION

	AdminaStar		IFMC		Providence Hospital	
	Refusers	Control Group Members	Refusers	Control Group Members	Refusers	Control Group Members
Percentage Age 85 or Older Six Months after Enrollment Decision	30.7***	15.3	23.8**	17.9	24.7***	16.1
Percentage Nonwhite	5.6*	7.6	3.9	2.5	17.6**	24.6
Percentage with Medicaid Buy-In for Medicare A or B	15.0***	8.8	10.2	12.7	5.7**	2.9
Percentage Who Died During Six Months after Enrollment Decision	14.0***	8.3	24.3**	19.0	13.4***	5.7
Percentage Receiving Medicare Services During the Six Months Following Enrollment Decision						
Inpatient hospital	39.2	38.9	42.9*	48.5	43.2	40.8
Skilled nursing facility	9.4*	7.2	13.9	14.6	14.8***	9.1
Home health	25.9**	21.4	30.9***	40.2	51.8*	58.8
Inpatient admission that included an emergency room visit	29.5	28.6	30.1*	35.5	28.0**	21.4
Outpatient emergency room visit	19.8*	22.8	20.6	20.1	22.7**	16.6
Mean Medicare Reimbursement During Six Months Following Enrollment Decision (Dollars) ^a						
Part A	4,186	3,922	5,154	5,631	7,636	8,268
Part B	1,219**	1,385	1,924	2,089	2,561	2,645
Total	5,405	5,307	7,079	7,720	10,197	10,913
Number of Observations	4,641	556	1,569	363	1,169	211

SOURCE: Birth date, race, and Medicaid buy-in status are from the Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996. Date of death is from Enrollment Data Base accessed in August 1996. Service use and reimbursement data are from the 1993 through 1995 National Claims History files.

NOTE: AdminaStar refusers include all potentially eligible beneficiaries who did not become consenting eligible beneficiaries; IFMC and Providence Hospital refusers are eligible beneficiaries who did not consent to participate in the demonstration.

All project study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files. Control group members who died prior to random assignment are also excluded, as are 2,146 AdminaStar potential eligibles who died before the random assignment date of their respective enrollment wave.

The period of observation for AdminaStar is the six months following December 17, 1993, for the first wave of identified beneficiaries and is the six months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for consenting eligible beneficiaries in the IFMC and Providence Hospital projects is the six months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the six months following the day after hospital discharge if the beneficiary was randomized while in the hospital. For nonconsenting eligibles in the IFMC and Providence Hospital projects, it is the six months following the date of refusal. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

TABLE II.5 (continued)

^a We also compared distributions of beneficiaries across these reimbursement levels (below the 25th percentile, between the 25th and 75th percentile inclusive, and above the 75th percentile) because participation rates of beneficiaries at the low and high ends of the distribution might be different from the rates of those in the middle. Such differences could be obscured by comparisons of mean reimbursement. However, no statistically significant differences existed between refusers and control group members in these distributions.

*Significantly different from zero at the .10 level, two-tailed comparison of means test.

**Significantly different from zero at the .05 level, two-tailed comparison of means test.

***Significantly different from zero at the .01 level, two-tailed comparison of means test.

and, as a result, slightly higher mean reimbursements.¹⁰ Higher service use among control group members is the opposite pattern of that observed for the other two projects. We are not sure why this occurred. It is possible that physicians of beneficiaries identified by the IFMC project tended to discourage healthier patients from participating. However, we had no suggestion that this was the case from any of the physicians or project staff we talked with during case study interviews.

We also estimated a multivariate (probit) model of the decision to participate in the demonstration, controlling simultaneously for demographic characteristics, Medicare service use and reimbursement during the predemonstration year, consent date relative to the project enrollment period, and a few project-specific variables available for all eligible beneficiaries at each project (see Table A.1). The multivariate results did not differ markedly from the bivariate comparisons just described. The only factors consistently associated with the decision to participate in case management at all three projects were age and whether the beneficiary died during the six months following the participation decision. Thus, older beneficiaries (those age 85 or older) were less likely to participate, regardless of whether they had a terminal illness; conversely, beneficiaries with a terminal illness were less likely to participate, regardless of age.

Associations between previous Medicare service use or reimbursement (proxy measures for severity of illness) and participation were essentially the same as those observed in the bivariate comparisons for AdminaStar and IFMC. For Providence Hospital, however, there were no statistically significant effects of prior service use on the participation decision after we controlled for demographics and whether eligible beneficiaries were community referrals.

A few project-specific factors appeared to affect the participation decision. For example, among beneficiaries potentially eligible for the AdminaStar project, those who had a hospital stay within two months of the decision were less likely to participate. Consistent with the bivariate results, among

¹⁰Refuser/control group comparisons of mean Medicare reimbursement could have been distorted by their differential mortality rates. However, refuser and control group means for Medicare reimbursement per month alive were roughly similar for all groups.

beneficiaries eligible for the Providence Hospital project, community referrals were much more likely to participate than eligible beneficiaries in other target groups. (This may have been due, in part, to beneficiaries in this target group being referred by their physicians rather than recruited while hospitalized.) We hypothesized that case managers may have become more skilled at marketing the projects over time. However, beneficiaries approached during the first six months of enrollment activities (or, for AdminaStar, during the December enrollment wave), were no less likely to participate than those approached later.

Finally, we compared Medicare service use and reimbursement levels during the first demonstration year for control group members with those of the general population of beneficiaries in each project state (see Table II.6). Due to random assignment, control group members should reflect the experiences of project clients had they not received case management. Control group members had substantially higher levels of hospital, SNF, and home health use and had higher hospital reimbursements per user than did the general population.¹¹ Thus, the demonstration did indeed attract individuals who would have experienced similarly high levels of Medicare use and costs in the absence of the demonstration. This result is not surprising, given the large differences between all eligibles and the general population, as well as the general similarity of refusers and participants.

D. RANDOM-ASSIGNMENT PROCEDURES AND RESULTING RESEARCH STUDY GROUPS

Consenting eligible beneficiaries were randomly assigned to treatment or control status to allow the demonstration evaluation to yield clear and credible impact estimates. Those assigned to the treatment group became project clients and received case management services reimbursed by Medicare, in addition to regular Medicare benefits. Those assigned to the control group received regular Medicare benefits. Project staff informed beneficiaries about the use of random assignment, both in introductory presentations

¹¹The differences in mean home health reimbursement per user were only statistically significant for the IFMC and Providence Hospital control groups. None of the control group mean SNF reimbursements per user was statistically different from those for SNF users more generally in each state.

TABLE II.6

**MEDICARE SERVICE USE AND REIMBURSEMENT DURING THE FIRST DEMONSTRATION YEAR
BY CONTROL GROUP MEMBERS COMPARED WITH ALL BENEFICIARIES IN 1994**

	AdminaStar Control Group	All Indiana Beneficiaries	IFMC Control Group	All Iowa Beneficiaries	All Nebraska Beneficiaries	Providence Hospital Control Group	All Michigan Beneficiaries	All United States Beneficiaries
Inpatient Hospital								
Percentage Receiving Care	52.9	20.9	61.7	19.9	17.9	53.6	20.1	19.3
Average Reimbursement per Recipient (Dollars)	10,967	8,946	10,485	7,709	8,336	15,192	10,949	10,207
Skilled Nursing Facility								
Percentage Receiving Care	11.2	3.9	19.0	3.6	3.7	12.0	2.8	3.0
Average Reimbursement per Recipient (Dollars)	7,340	6,220	4,405	3,396	3,514	5,206	3,802	5,528
Home Health								
Percentage Receiving Care	29.3	8.0	43.4	7.0	6.6	58.3	8.8	9.4
Average Reimbursement per Recipient (Dollars)	3,651	4,000	3,503	2,280	2,566	4,766	3,285	4,016
All Medicare Services								
Average per Enrollee (Dollars)	10,481	3,945	12,851	3,080	2,926	16,224	4,307	4,375

SOURCE: State and United States data for 1994 from *Medicare and Medicaid Statistical Supplement*, 1996, and personal communication with HCFA Office of Research and Demonstrations staff. Data describing the demonstration project samples are from the 1993 through 1995 National Claims History files.

NOTE: The period for observation for AdminaStar is the year following December 17, 1993, for control group members randomized in the first enrollment wave and is the year following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for IFMC and Providence Hospital control groups is the year following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the year following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

TABLE II.6 (continued)

Study groups are restricted to those control group members randomized before 1995 who had complete data for the year following random assignment. Study group sizes are: 556 for AdminaStar, 290 for IFMC, and 168 for Providence Hospital. All project study groups exclude control group members whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, as well as those who died prior to random assignment.

All project percentages and mean hospital reimbursements per user are statistically significantly different from their respective state means (at the .05 level using a two-tailed test). In addition, the differences in mean home health reimbursements per user are statistically different (at the .05 level) from the state means for the IFMC and Providence Hospital projects.

and through literature. (The use of random assignment did not appear to have played any role in the high refusal rate among beneficiaries, but some physicians at the Providence Hospital project stated that random assignment had prevented their giving consent.) The projects each performed random assignment “blindly.” Two of the projects used computer programs. The Providence Hospital project performed random assignment using lists of numbers developed from a random number table.

Random assignment appears to have been successful in creating treatment and control groups that were statistically similar for each project. Comparisons of demographic information (from the Medicare eligibility files), Medicare service use and reimbursement during the year before random assignment, and preenrollment characteristics for which the projects kept data on both clients and control group members generally revealed no statistically significant differences between the two groups. A few statistically significant differences were observed, but these differences tend to be fairly small and to exhibit no consistent pattern that would suggest subversion of the random-assignment process. (See Tables A.2 to A.10 for client and control group means of all variables examined and the significance levels of t-tests used to compare them.)

E. DISCUSSION

Despite the fact that the target populations differed across projects, all three demonstration projects clearly identified groups of Medicare beneficiaries who had much higher than average Medicare service use and reimbursements during the demonstration period. Approaches to identifying targeted beneficiaries included both relatively inexpensive claims review and more labor-intensive (and, thus, more costly) ongoing hospital admissions review.

During case study interviews, we asked project staff members how they would have changed target criteria if they were starting the demonstration anew and which groups of clients they believed had benefited most from case management. Answers to both these questions could be used to shape future case management targeting efforts. All three projects suggested excluding nursing home residents either

because they had no needs that the case managers were in a position to address or because almost all of the self-care behaviors the projects were trying to change (such as taking medications as prescribed and monitoring symptoms) were controlled by nursing home staff rather than beneficiaries. AdminaStar staff thought that individuals older than age 85 were too old to make the types of lifestyle changes the project encouraged, primarily because very old people had already lived with their conditions for a long time and tended to see no point in changing. On the other hand, Providence Hospital staff stated that individuals under age 75 might be too young and relatively healthy, and therefore not in need of case management. Staff identified the group of individuals most likely to have benefited from case management as those beneficiaries who had multiple medical conditions, who were taking multiple medications, who had impairments in activities for daily living (such as personal care, bathing, eating, or ambulating), or who needed but did not have adequate informal support.

Higher than expected refusal rates were a problem for all three projects. They led AdminaStar to use two rounds of claims review and mailings to potentially eligible beneficiaries rather than the one planned. Higher than expected refusal rates, combined with lower than expected referral and eligibility verification rates, led HCFA to extend the enrollment period for IFMC and Providence Hospital from one year to 18 months. IFMC refusals were dominated by physician refusals, primarily attributed to the “punitive” reputation the host organization acquired in its role as PRO. Providence Hospital refusals were dominated by beneficiary refusals. Many beneficiaries simply did not respond to the project’s offer to participate, while others believed the project might hinder access to services or felt they had no need of its services. Still others were too overwhelmed by their immediate hospitalization to consider participation.

With project staff, we discussed how refusal rates could have been lowered. Case managers with all projects agreed that it was not optimal to approach elderly individuals about this type of intervention while they were hospitalized. As the Providence Hospital staff pointed out, hospitalized individuals are too overwhelmed to make the decision, nor do they have a good idea of how well or poorly they will be able to function when they leave the hospital. Thus, refusal rates might have been lower if the projects

approached eligible beneficiaries within the first few months after a hospital stay. (This approach is also suggested by the fact that beneficiaries who had been hospitalized during the two months before the enrollment decision were less likely to participate in the AdminaStar project.) Refusal rates among physicians might have been lower at IFMC if the project had recruited opinion leaders among physicians at each of the 10 referring hospitals. This might have reassured physicians that they would not “lose control” of patients’ care who became clients and might have helped to overcome some of the host organization’s poor reputation among community physicians.

We wished to assess whether the voluntary nature of the demonstration changed the composition of the high-cost population identified by the projects’ targeting criteria and procedures. To this end, we compared eligible beneficiaries who declined to participate with those who consented. The only consistent difference between consenters and refusers was that refusers for each project were older and more likely to have a terminal illness. Thus, the clients actually served in the demonstration were generally representative of the high-cost cases identified by the target criteria and in particular, had much higher than average hospitalization rates and reimbursements. Project clients would have had Medicare costs far above the state average in the absence of the demonstration.

Random assignment did not emerge as a barrier to participation for beneficiaries. However, random assignment appeared to pose a substantial dilemma for Providence Hospital case managers and beneficiary physicians. The sense of community that existed among patients and hospital staff made the notion that some patients could get a service while others could not (as a result of random assignment) distasteful to some staff physicians. In addition, Providence Hospital case managers performed a brief initial assessment of all consenting eligible beneficiaries prior to random assignment (to collect baseline data for the project); they then found it stressful to not be allowed to provide services to those who later were assigned to the control group. They also found it difficult to market the project knowing that beneficiaries only had a 50 percent chance of receiving services. In addition, patients of Providence Hospital were used to getting a range of different services through the hospital without having to sign special consent forms. Staff believed

having to sign the demonstration consent form “set off warning lights” for patients and scared many away. Nonetheless, random-assignment procedures appeared to have yielded treatment and control groups that were statistically similar.

III. CASE MANAGEMENT AND ITS COSTS

The Medicare Case Management (MCM) projects' interventions shared several key activities: client assessment and periodic reassessment, service coordination and monitoring, condition-specific self-care education, and emotional support to clients and their informal caregivers. The projects differed noticeably, however, in their relative emphasis on education and service coordination and the degree to which case management activities were structured or allowed to evolve based on case manager judgment. They also differed widely in the average amount of time per month case managers spent with each client and the cost per client per month. All three projects served clients with Medicare costs much higher than the average beneficiary in the years prior to and following demonstration enrollment. The projects' clients differed, however, on the length of time since their most recent hospital stay before enrolling and on measures of functional disability.

In this chapter, we describe each of the demonstration projects, the number and characteristics of project clients, and the costs of case management as it was implemented. We also discuss clients' attitudes toward the case management services they received.

A. PROJECT DESIGN FEATURES

Table III.1 provides an overview of key elements of the case management interventions that each project implemented.

1. AdminaStar

The AdminaStar intervention's primary focus was client education and, to a lesser extent, referral to support services and financial assistance. AdminaStar contacted clients by telephone and mail only. Clients who enrolled in December 1993 could receive AdminaStar services for up to two years. Clients who enrolled in April 1994 could receive up to 20 months of services.

TABLE III.1

KEY CASE MANAGEMENT FEATURES FOR THE MEDICARE CASE MANAGEMENT PROJECTS

	AdminStar	IFMC	Providence Hospital
Intervention Focus and Mode	Telephone intervention to provide CHF education and monitoring of treatment regimens and symptoms; referrals for support services; caregiver support	Intervention primarily through telephone contact to provide CHF/COPD education and monitoring of treatment regimens and symptoms; assistance arranging for support services; caregiver support	Telephone and in-person contact to provide assistance arranging for support services; client advocacy; condition-specific education; caregiver support
Duration of Intervention	Two years planned; for clients randomized in April 1994, 20 months	One year planned; for clients randomized after October 1994, between 6 and 11 months	One year planned; for clients randomized after December 1994, between 6 and 11 months
Assessment and Reassessment	Project-specific assessment form included CHF etiology, frequency of common CHF symptoms, lifestyle habits related to CHF control, medications, comorbid condition, ADL limitations, informal support; reassessment at each contact with set of follow-up questions	FASE included measures of mental status and ability to perform ADLs; KanSAS assessment included health status, medications, lifestyle habits, emotional status, informal support (KanSAS administered to clients who "failed" FASE); reassessment with tools at 3, 9 and 12 months; reassessment informally at each contact	Assessment forms included measures of mental status, ability to perform ADLs and IADLs, depression, morale, medications, health status, informal support; reassessment quarterly in person
Case Management Planning	Plans included client goals regarding CHF education; social work referral documented need for support services	Plans included support services, cardiac rehabilitation, and therapy, as well as Medicare-covered services arranged by discharge planners and physicians	Plans included support services, medical services, and education, including services arranged by physicians and discharge planners
Client/Caregiver Education	Highly focused CHF education at each contact, building on educational pamphlet mailed to client just after random assignment; quarterly newsletters	Education at each contact	Education as noted in case management plan
Service Arranging and Monitoring	Case managers referred clients to social worker for support services; social worker contacted local AAA, with referral and followed up until services in place; also assisted with paperwork for indigent drug programs	Case managers arranged for services not ordered by physicians or discharge planners; telephone followup with providers and clients	Case managers arranged and coordinated services and followed up with providers and clients; included coordination for hospitalized clients
Quality Assurance (QA) Procedures	Quarterly review of five percent of each case manager's case records; case managers QA'd support services by questioning clients	Monthly review of two cases per case manager by IFMC nurse reviewer; case managers QA'd support services by questioning clients	Case manager supervisor reviewed cases periodically; case managers QA'd support services by following up on client complaints
Staff Composition	Seven FTE nurse case managers, one case manager supervisor, 1 social worker	Four FTE nurse case managers; project director was also case manager supervisor	Three FTE case managers (two nurses, one social worker), one case manager supervisor

NOTE: "Support services" refers to homemaker/housekeeping, transportation to medical appointments, home-delivered meals, assistance purchasing medications.

AAA = Area Agency on Aging; ADL = activities of daily living; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; FTE = full-time-equivalent; IADLs = instrumental activities of daily living; FASE = Functional Assessment Screen Evaluation.

a. Assessment

AdminaStar's client assessment focused primarily on problems associated with congestive heart failure (CHF): common symptoms such as shortness of breath, swelling of extremities, endurance and activity limitation, and chest pain; the client's ability to monitor symptoms; and lifestyle habits such as diet, smoking, drinking, and regular contact with physicians. The assessment also collected information on medications and comorbid conditions. Clients were reassessed at each contact using a standard set of follow-up questions (concerning, for example, shortness of breath, weight, and endurance) as a guide.

The project had planned to include, as input to the assessment, information from clients' physicians concerning medical treatment plans and client need for education, monitoring, and social services. However, the project received very little response to letters sent to physicians requesting input. Thus, almost all assessment information came directly from the clients.

b. Case Management Planning and Monitoring

The first step of planning for the AdminaStar project was to assign the client to a case management level on the basis of the initial assessment. The case management level specified the frequency with which the case manager would call the client, and the level was changed whenever appropriate. Just under a quarter of clients were initially assigned to the most intense case management level (because they reported a recent substantial change in health status, such as increasing weakness or shortness of breath, had recently been hospitalized for CHF, or had serious problems adhering to treatment recommendations). Clients assigned to this level were called every one to seven days. About half were initially assigned to a moderate level (because they reported slight changes in health status, had not been hospitalized in the past three months, and had less serious problems adhering to recommended treatments). Clients at the moderate level were called every 7 to 14 days. Just over a quarter of clients were assigned to the least intense level (for which they were called every three to six weeks).

The AdminaStar project used a standard case management plan form. Plans included client goals (such as understanding the definition, signs, and symptoms of CHF, and the CHF treatment plan); a plan for achieving these goals; and tasks for the case manager and the client related to monitoring weight and blood pressure, adherence to medication regimens and diet, and assessment of endurance and level of informal support.

c. Education and Service Arranging/Coordinating

The focus of the AdminaStar project was educating clients about CHF. Education included explaining the purpose of medications, teaching clients about diet (for example, how to read food labels and prepare meals according to prescribed diets), teaching clients how to monitor signs and symptoms and when to call their physicians, and reinforcing physician recommendations for exercise and stress management. Case managers spent considerable time teaching clients how to report symptoms to physicians and following up with clients to assess the results of their calls to physicians. Case managers provided education with each telephone contact. In addition, just after random assignment, the project sent each client a patient education booklet developed by Emory University and also sent quarterly newsletters developed by project case managers over the course of the intervention. All literature was used for teaching during subsequent telephone contacts. The project also sent clients specific diet or medication information sheets as needed.

Project staff included a social worker who helped procure financial assistance for the purchase of medications and provided referrals to support services. She developed guidelines for case managers to prompt social work referrals. If clients needed financial assistance to purchase medications, the social worker helped with the paperwork needed to gain access to pharmaceutical company indigent programs. She arranged for homemaker services, home-delivered meals, and transportation to medical appointments through local Area Agencies on Aging (AAA). She also arranged with charities to obtain items (such as scales for some clients who could not afford them and, thus, had not been monitoring their weight).

d. Quality Assurance Procedures

Training and Supervising. The staff received a four-week orientation prior to the start of the demonstration. The orientation included an overview of the demonstration and its funding, the case management process, medical protocols for CHF therapy, and the use of office equipment (including the project's computer system). The project director (and, later, the case manager supervisor) monitored the number of contacts each case manager made each day. The weekly staff meetings also provided an opportunity for supervision.

Quality Assurance Review. Case management quality assurance activities included a quarterly review of a randomly selected five percent of each case manager's caseload (four cases per quarter) conducted by the case manager supervisor. (Initially, the project director and case manager supervisor reviewed all care plans.) The project had originally planned to refer quality problems to the medical director but never had to do so.

The case managers monitored the quality of support services by questioning clients about the timeliness, courteousness, and cost of services and their satisfaction with them. Quality problems with services would have been referred to the project medical director, but none arose. If a quality problem with a client physician had been identified, the medical director had planned to intervene to provide education on treatment protocols or arrange a consultation with a cardiologist. If the physician problem had been egregious, the medical director would have referred the case to the Peer Review Organization (PRO). However, no quality problems with physicians arose that warranted any such intervention.

2. Iowa Foundation for Medical Care (IFMC)

The IFMC project focused on both service arranging and education. Contact with clients was mainly by telephone, although case managers presented the project to prospective clients in person while they were hospitalized and occasionally made home visits or accompanied clients to physician appointments. The

project planned a one-year intervention. However, clients enrolling between October 1994 and March 1995 (the 6-month enrollment extension period) received between 6 and 11 months of services.

a. Assessment

The IFMC project used two preexisting tools to assess client need for services: (1) the relatively short Functional Assessment Screen Evaluation (FASE) and (2) the longer KanSAS. All clients were to have received the FASE assessment, which measures mental status and ability to perform activities such as personal care, shopping, preparing meals, and taking medications. Those clients who “failed” the FASE (that is, incorrectly answered one or more mental status questions or were unable to perform two or more activities) were administered the KanSAS assessment.¹ Clients were reassessed formally with these tools three and nine months after random assignment and at the project’s end. In addition, during each telephone contact, case managers reviewed a checklist of common symptoms and problems encountered by clients with CHF or chronic obstructive pulmonary disease (COPD) to informally assess changes in service and education needs.

b. Case Management Planning and Monitoring

Project case management plans documented clients’ needs for medically oriented services (such as home health, provision of in-home oxygen, and physical therapy) and case manager recommendations for support services. In addition to case manager recommendations, the plans included services recommended on hospital discharge and physician treatment plans. Case management plans did not include education provided by case managers. Automated case management plan data available to the evaluation did not provide much detail about recommendations for support services. The project also provided assistance

¹Case managers inadvertently administered only the KanSAS assessment to 20 clients. Thus, data describing basic physical and mental functioning collected by the FASE were not available for those clients.

in identifying no-cost or reduced-rate medications and in getting medications delivered to clients. However, these services were not listed among the automated case management plan data.

When the client and case manager agreed on the set of services the client would receive, the case manager prepared a care coordination schedule for the client and providers indicating when and how frequently agreed-upon services were to be provided. If a physician signature was required to secure a service (such as home health care), the case manager contacted the physician's office to request the signature.

Case managers contacted clients as frequently as they believed necessary.

c. Education and Service Arranging/Coordinating

The IFMC case managers reported that all clients received education about their conditions (CHF or COPD) to enhance their understanding of medication and diet regimens and to help them recognize symptoms or changes in health status that warrant a call to their physicians. The goals of this education were to facilitate self-care and help clients identify treatable problems before they became medical emergencies. The case managers also monitored symptoms with each telephone contact, using a checklist of common CHF or COPD symptoms and problems.

Case managers arranged for all services in case management plans (not already put in place by a hospital discharge planner or physician) rather than referring clients to providers, unless the client wished to make the arrangements. Case managers followed up on service provision through periodic telephone calls to service providers, as well as following up with clients on the receipt of agreed-upon services.

d. Quality Assurance Procedures

Training and Supervising. Each case manager attended a four-day training session at the start of the project. The session reviewed relevant topics in anatomy and nursing assessment, issues concerning service provision, and specific features of the IFMC project (including the use of the FASE and KanSAS

assessments and laptop computers). The project manager supervised the case managers by regular review of case management plans and other information kept on the laptops and provided feedback as needed.

Quality Assurance Review. Monitoring of case managers was based on the review of two randomly selected cases per case manager each month. The review was carried out by an IFMC Medicare nurse reviewer external to the project, who assessed the accuracy and consistency of documentation, the timeliness of assessment, the appropriateness of service decisions, and whether clients were given a choice of providers.

The monitoring of support services was to include a monthly review of a random selection of provider records (for example, nursing notes from home health nurses). This review was to evaluate whether providers served clients appropriately and in a timely fashion and whether clients were accepting agreed-upon services. Case managers could recommend that providers' services be terminated if quality problems were detected and that the fiscal intermediary be notified if Medicare services were not delivered as agreed. In practice, the project had difficulty getting provider records. Providers felt it was a breach of patient confidentiality to provide them and were under no obligation to the project to do so. The project chose to notify licensing or certifying agencies (for example, the state Department of Inspection and Appeals) of quality problems with providers. The staff decided sending letters directly to the providers would be confrontational and could adversely affect client care. The project manager estimated that fewer than 10 home care agencies and durable medical equipment vendors (out of 163 the project dealt with) had been reported as having quality problems (such as not delivering ordered services).

3. Providence Hospital

Relative to the other projects, the Providence Hospital project focused more on service coordination and client advocacy and to a lesser extent on client education. Case managers contacted clients primarily by telephone, but clients were assessed initially and reassessed quarterly in person. Project case managers also visited clients when they were hospitalized. The project planned a one-year intervention. However,

clients enrolling between December 1994 and May 1995 (the 6-month enrollment extension period) received between 6 and 11 months of services.

a. Assessment

Clients received a comprehensive assessment describing limitations in activities of daily living (for example, bathing, toileting, and eating), instrumental activities of daily living (for example, using the telephone, shopping, and managing medications), mental and emotional status, social supports, living environment, financial status, problems with sleeping and eating, self-perceived health, and health care patterns. The project used a standard assessment form and a number of preexisting assessment tools (such as the Short Portable Mental Status Questionnaire and the Philadelphia Geriatric Center Morale Scale).

b. Case Management Planning and Monitoring

Assessment information was combined with hospital discharge plans and physicians' treatment plans to identify problems and needs; the case managers developed case management plans from this information. If the client was getting home health care, the case manager also received plan input from the home health agency. The project used a standard case management plan form, a copy of which was forwarded to the client's physician. Unlike the other two projects, the case management plan form (and project database) included information on medically oriented services, support services, and education. Clients and case managers discussed the contents of case management plans, but clients did not formally sign off on plans or receive copies of the plans.

In addition to quarterly reassessment, case managers contacted clients as often as they believed necessary.

c. Education and Service Arranging/Coordinating

Most clients received some education about their medical conditions, nutrition, or the importance of adherence to medication regimens. Condition- and problem-specific education was based on information

sheets from the American Heart Association, the Alzheimer's Association, adult day care and respite programs, and other organizations. Case managers also provided education informally to clients as needed.

The Providence Hospital intervention appeared to emphasize service arranging and coordinating to a greater degree than the other two demonstration projects. Case managers began arranging for services at the time of assessment if they identified a service need and could arrange for it by telephone from the client's home. Case managers arranged for services on behalf of clients or referred clients to services, depending on the abilities and preferences of clients and caregivers. However, the case managers aimed to foster autonomy and teach clients and caregivers to advocate for themselves.

The Providence Hospital intervention seemed to be the only one of the three projects in which case managers routinely visited clients in the hospital and, on at least a couple of occasions, intervened to prevent iatrogenic problems. The closed system in which the hospital framed the demonstration project made it much easier for the case managers to visit clients in the hospital and influence care.

d. Quality Assurance Procedures

Training and Supervising. The case managers described their training as "trial by fire." They received orientation from the project director and reviewed the evaluation proposal, then went out to visit different hospital departments and community service providers to learn what the departments and providers did. Supervision was primarily informal because of the small number of case managers (two before October 1994, three thereafter). The case manager supervisor periodically reviewed the content and timeliness of case management plans. The medical and project directors also provided supervision and ongoing training through weekly meetings with the case managers.

Quality Assurance Review. The operational protocol for the Providence Hospital project stated that quality assurance of case management services would include (1) providing clear job descriptions and performance criteria; (2) monitoring disenrollment rates, cost per client, and completeness of assessment and care plan data; and (3) administering client and physician satisfaction surveys. The project and medical

directors carried out most monitoring functions. The hospital's steering committee was supposed to review a five percent random selection of each case manager's care plans; however, this did not occur because of the small scale of the project. Although the project had no formal process for reviewing the performance of service providers, case managers checked to make sure agreed-upon services were received and followed up on client complaints regarding services.

4. Project Comparisons

All three projects provided the basic case management functions of assessment, planning, service arranging, and education. However, they differed substantially in the *level of in-person contact* they had with clients. AdminaStar case managers had no opportunity for in-person client contact. However, the staff there believed roughly 10 percent of their clients would have benefited from some in person contact. AdminaStar and IFMC staff members stated that an in-home, in-person assessment would have improved their ability to address problems in clients' living environments. Providence Hospital, whose case managers had the most in-person client contact, believed that some of their clients did not require in-person reassessment every quarter. However, case managers from each project believed that clients valued the easy access they had to case managers by telephone and derived a great deal of comfort from that contact.

Projects differed in their relative *emphasis on nursing and social work*. IFMC staff was made up entirely of nurses who had a variety of employment backgrounds. All the AdminaStar case managers (and the project director) were nurses, again with a variety of nursing backgrounds. However, AdminaStar had one social worker on staff to whom the nurse case managers could make referrals for support services. Providence Hospital had one social worker case manager (out of three); the case manager supervisor was also a social worker. Staff at all three projects stated that nurses were appropriate case managers for clients who primarily needed disease education; this included many clients with CHF or COPD.²

²As noted earlier, AdminaStar served only beneficiaries with CHF, IFMC served beneficiaries with CHF or COPD, and Providence Hospital served clients with various diagnoses.

AdminaStar staff members, however, stated that the social worker should have had a larger role in the project. Each client should have been given a comprehensive social service evaluation at enrollment. They believed it was likely that only the more vocal clients were referred to the social worker, while some quieter clients with the same needs were not referred because the case managers did not have a systematic way of identifying those needs. They also stated that clients would have benefited from having several regional social workers, rather than one for the entire state of Indiana, because service availability was region specific.

By their own description, it appears that IFMC nurse case managers learned to be social workers on the job. During the first year of the demonstration, they did not seem to be fully aware of the need for or availability of the more socially oriented services; over time, they learned the importance of networking with service providers. Providence Hospital staff members stated that clients should be assigned either a nurse or social worker case manager, based on their specific needs. Those who primarily had a need for disease education should get a nurse, while those primarily with problems of family dynamics should get a social worker. They suggested a nurse and social worker might perform the initial assessment as a team and then decide which type of case manager would be best.

The projects differed in the extent to which *case management activities were structured and standardized*, rather than left to the discretion of individual case managers. AdminaStar presented the most highly structured intervention of the three. Its operational protocol specified how frequently case managers were to contact clients with different levels of need; its educational message was clearly delineated in the CHF booklet it sent to clients at enrollment and on which subsequent teaching was based. Standardized case management plans and a set of specific follow-up questions provided case managers with concrete guidelines for all client contacts. The other two projects developed and used forms and letters to standardize client assessment and communication with clients and providers. IFMC case managers had a list of CHF and COPD symptoms they reviewed at each client contact. However, the

content of IFMC and Providence Hospital client contacts was left largely to the discretion of case managers.

Finally, projects differed in their *emphasis on client education* and, therefore, the degree to which educational efforts were focused and made systematic. AdminaStar placed the greatest emphasis on education and took the most systematic and consistent approach. These efforts were facilitated because AdminaStar had only one target condition on which to focus. Educational efforts at the other two projects were less systematic. The projects' relative *emphasis on service arranging and client advocacy* appeared to be inversely related to their emphasis on education. The Providence Hospital project placed the most emphasis on services and advocacy. Its relatively small geographic service area, high level of in-person client contact, and social worker case manager facilitated such activities.

B. CLIENT PARTICIPATION

The target criteria and procedures of each project identified beneficiaries likely to have Medicare costs substantially above average during the demonstration period. However, because their target criteria, procedures, and service areas differed, the projects' clients had differing characteristics.

1. Client Characteristics

Medicare eligibility and claims data on service use and reimbursement during the year before enrollment can be used to compare the demographics and health of clients across projects (see Table III.2). These data show that roughly similar proportions of project clients (15 to 18 percent) were age 85 or older. The Providence Hospital project had a much higher proportion of nonwhite clients (26 percent) than the other two projects (9 and 5 percent). This presumably reflects differences in the racial mix of the projects' service areas. (Michigan, particularly in the Detroit area of which Southfield is a suburb, has a higher proportion of nonwhite residents than does Indiana, Iowa, or Nebraska.) Providence Hospital had a much lower percentage of clients who were dually eligible for Medicare and Medicaid (4 percent, compared with

TABLE III.2

SELECTED CLIENT CHARACTERISTICS AT RANDOM ASSIGNMENT,
BASED ON MEDICARE DATA
(Percentages Unless Otherwise Noted)

	AdminaStar	IFMC	Providence Hospital
Age 85 or Older	15.4	17.3	18.2
Nonwhite	8.5	4.8	25.9
With Medicaid Buy-In for Medicare A or B	10.1	13.3	3.8
With Disability as Original Reason for Medicare Entitlement	12.1	16.5	13.4
Receiving Medicare Services During the Two Months Prior to Random Assignment			
Inpatient hospital	14.2	87.7	89.0
Skilled nursing facility	0.7	7.4	6.7
Home health	17.3	17.0	31.6
Receiving Medicare Services During the Year Prior to Random Assignment			
Inpatient hospital	89.4	99.7	91.9
Skilled nursing facility	6.7	10.9	8.1
Home health	29.0	27.1	42.1
Mean Medicare Reimbursement During the Year Prior to Random Assignment (Dollars)			
Part A	8,634	11,194	12,173
Part B	2,574	3,846	4,653
Total	11,208	15,040	16,826
Number of Observations*	556	376	209

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996; 1992 through 1995 National Claims History files.

NOTE: See Appendix Tables A.2 through A.7 for additional tabulations of client (and control group member) characteristics.

The period of observation for AdminaStar is the year (or two months) before December 17, 1993, for the first wave of identified beneficiaries and is the year (or two months) before April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for clients in the IFMC and

TABLE III.2 (continued)

Providence Hospital projects is the year (or two months) before the date of random assignment if the client was randomized after hospital discharge (or was a Providence Hospital community referral) but the year (or two months) before the day after hospital discharge if the client was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

*Excludes clients with no match to Medicare eligibility files, with no Medicare-covered hospitalization on claims files (other than for Providence Hospital community referrals), or who died prior to random assignment (12 AdminaStar clients, 30 IFMC clients, and 12 Providence Hospital clients).

10 percent for AdminaStar and 13 percent for IFMC). This may reflect the suburban, largely middle-class nature of the hospital patient base. Roughly similar proportions of project clients (12 to 17 percent) were originally eligible for Medicare because they had a permanent disability before they reached age 65, suggesting they may have been in poor health for some time before entering the projects. That 17 percent of IFMC clients had been entitled to Medicare due to a disability may reflect the fact that IFMC was the only project that included nonelderly, disabled Medicare beneficiaries.

A comparison of the use of Medicare Part A services *in the two months preceding enrollment* suggests that IFMC and Providence Hospital clients may have been more medically unstable or in poorer health at the time of random assignment than AdminaStar clients. Just under 90 percent of IFMC and Providence Hospital clients had been hospitalized shortly before enrollment, compared with only 14 percent of AdminaStar clients. This difference results from AdminaStar identifying prospective clients through the review of Medicare claims and the other two projects identifying most clients while they were hospitalized. (Rates of hospitalization during the *year* before random assignment were much closer for the three projects.) IFMC and Providence Hospital clients were also much more likely than AdminaStar clients to have been in a skilled nursing facility (SNF) during the two months preceding enrollment. Finally, Providence Hospital clients were much more likely than clients of the other two projects to have received home health care during the two months before enrollment. To receive Medicare home health services, a beneficiary must be homebound and also require intermittent, skilled nursing, or therapy services. Thus, Providence Hospital clients may have been the most medically unstable (or functionally impaired) of the three projects' clients. The higher rate of home health use among Providence Hospital clients may also have been related to the fact that the host organization owned a home health agency.

Consistent with target criteria, all AdminaStar clients had CHF (see Table III.3). Most (70 percent) IFMC clients had CHF, while 30 percent had COPD. Among Providence Hospital clients, just 11 percent had CHF and 7 percent had COPD. The largest Providence Hospital target group was made up of clients

TABLE III.3

SELECTED CLIENT CHARACTERISTICS AT INITIAL ASSESSMENT,
BASED ON DEMONSTRATION DATA
(Percentages)

	AdminaStar	IFMC	Providence Hospital
Target Condition			
Congestive heart failure	100.0	70.0	11.3
Chronic obstructive pulmonary disease	NA	30.0	6.8
Ischemic heart disease	NA	NA	22.6
Pneumonia/sepsis	NA	NA	14.5
Community referral	NA	NA	14.5
Stroke	NA	NA	13.1
Joint replacement	NA	NA	13.1
Nutritional/metabolic disorders	NA	NA	4.1
Identified as Potentially Eligible from Claims Review	100.0	11.1	0.0
Number of Observations	568	406	221

SOURCE: AdminaStar's Patients Assisted to Healthy Hearts (PATH) database; IFMC's Catastrophic Case Management (CCM) database; Providence Hospital's Geriatric Case Management (GCM) database.

NOTE: See Appendix Tables A.8 and B.1 for additional tabulations of AdminaStar client characteristics at enrollment measured with project assessment tools, Tables A.9 and B.2 for IFMC clients, and Table A.10 for Providence Hospital clients. (Tables A.8 through A.10 also contain control group characteristics.)

NA = not applicable.

with ischemic heart disease. Former Providence Hospital patients (community referrals) made up 15 percent of the project caseload.

Consistent with targeting procedures, all AdminaStar clients had been identified through claims review, and no Providence Hospital clients had been identified that way. Providence Hospital clients were either identified in the hospital or (in the case of community referrals) by their Providence Hospital physicians. IFMC had planned to identify all clients while they were hospitalized. However, a shortfall in referrals required IFMC to identify 11 percent of its caseload through claims review--a process made possible by the host organization's access to Medicare hospital claims.

Responses to the evaluation's six-month follow-up survey showed Providence Hospital's clients to have had more education and higher household incomes during the last full calendar year before the interview (for example, 1993 for those interviewed in 1994). (Chapter IV contains a description of survey procedures.) Thirty-two percent had attended college, compared with 22 percent of AdminaStar clients and 18 percent of IFMC clients (see Table III.4). Only 24 percent of Providence Hospital clients had annual incomes less than \$10,000 (as compared with 40 percent of AdminaStar clients and 42 percent of IFMC clients). This income difference is consistent with the lower percentage of Providence Hospital clients receiving Medicaid benefits. The survey also showed roughly half of the clients at each project were married at the time of interview.

Survey responses also allow us to compare the projects on clients' level of functional impairment, health assessment, and need for support services (although measured six months after enrollment and, thus, potentially affected by case management). (Each project measured baseline functioning differently, making cross-project comparisons with project data difficult.) Given this caveat, we observe Providence Hospital clients to be the most impaired of the three projects and, in particular, much more impaired than AdminaStar clients. For example, 32 percent of Providence Hospital clients required assistance with bathing (as compared with 18 percent of AdminaStar clients). Twenty-five percent of Providence Hospital

TABLE III.4
SELECTED CLIENT CHARACTERISTICS, BASED ON SURVEY DATA
(Percentages)

	AdminaStar	IFMC	Providence Hospital
Education			
Did not graduate high school	48.3	45.2	39.9
Graduated high school	30.0	36.7	28.6
Has some college	21.7	18.1	31.5
Total Household Income Last Year			
Less than \$10,000	39.7	41.5	24.0
\$10,000 to 19,999	38.4	39.3	40.6
\$20,000 to 29,999	13.7	11.3	24.0
\$30,000 or more	8.2	7.9	11.4
Marital Status			
Married	48.5	46.3	52.0
Widowed	41.5	41.0	40.2
Divorced, separated, never married	10.1	12.7	7.8
Client Health Assessment (at Interview)			
Very good	19.3	11.7	20.9
Good	32.7	41.0	30.9
Fair or poor	48.0	47.3	48.2
Ability to Function Independently During Past Two Weeks ^a			
Transfer from bed or chair	95.4	90.5	83.7
Walk indoors	89.9	83.9	82.8
Bathe	82.4	70.7	68.4
Take medications	89.1	80.6	74.9
Received Paid Assistance with Personal Care, Help Around the House, Meal Preparation, or Transportation to Medical Appointments During Past Six Months	29.9	37.8	45.3
Received Help from Family or Friends with Personal Care or Things Around the House or Community During Past Six Months	75.8	73.4	79.2

TABLE III.4 (continued)

	AdminaStar	IFMC	Providence Hospital
Found Arranging for Services Difficult or Needed More Personal Care or Help Around the House During Past Six Months ^a	34.8	33.3	46.6
Number of Observations^c	328	363	204

SOURCE: Evaluation's six-month follow-up telephone survey of clients (and control group members) fielded between May 1994 and November 1995.

NOTE: Variables describing health, functioning, ability to arrange for services, and use of services or informal help are all measured after random assignment and, thus, may have been affected by participation in case management project. They are presented here solely to compare project client caseloads.

^aMeasures reflect reports that client performed the activity independently or could have performed independently if no one were around to help.

^bServices asked about include: transportation to medical care, filling prescriptions, personal care, and help around the house or community.

^cStudy group sizes in table are numbers of clients responding to survey. Client Health Assessment and Ability to Function Independently exclude clients who had died or were in a coma. Maximum item nonresponse for other survey questions in this table for AdminaStar was 36 observations. The comparable numbers for IFMC and Providence Hospital were 45 and 29, respectively.

clients required assistance taking medications (either a reminder to take medications or help measuring or administering them), compared with 11 percent of AdminaStar clients and 19 percent of IFMC clients.

Most likely as a result of these high levels of disability, 45 percent of Providence Hospital clients reported receiving paid help with personal care, help with household activities, or transportation to medical appointments. Only 38 percent of IFMC clients and 30 percent of AdminaStar clients reported receipt of such paid services. On the other hand, roughly three-quarters of clients at each project reported receiving help from family or friends. A higher percentage of Providence Hospital clients (47 percent) reported difficulty arranging for this type of service or felt they needed more help than they were getting (compared with 35 percent of AdminaStar clients and 33 percent of IFMC clients). Thus, Providence Hospital clients emerge as a relatively disabled group, more likely to use paid support services (but not informal services) and more likely to report the need for additional services. This greater need corresponds with the greater emphasis the Providence Hospital project placed on arranging for support services and providing client advocacy.

2. Enrollment and Disenrollment Patterns

The IFMC and Providence Hospital interventions, each meant to last up to one year, had comparably low voluntary disenrollment rates but mortality rates that differed from one another.³ On average, IFMC clients spent 8.7 months in case management and Providence Hospital clients spent 9.8 months (see Table III.5). Among IFMC clients, the mortality rate between the time a client was randomly assigned to the treatment group and the time case management would have ended if the client had not died was 26 percent. This rate was markedly higher than the 14 percent rate for Providence Hospital, contributing to IFMC's lower average length of enrollment. Providence Hospital excluded beneficiaries who did not have a

³The demonstration period was two years. IFMC and Providence Hospital originally planned to enroll clients during the first year. Enrollment shortfalls led HCFA to extend the enrollment period to 18 months. However, clients who enrolled during months 13 through 18 could only receive services for between 6 and 11 months. This included 36 percent of IFMC clients and 21 percent of Providence Hospital clients.

TABLE III.5

CLIENT ENROLLMENT, DISENROLLMENT, AND REASONS FOR DISENROLLMENT

	AdminaStar	IFMC	Providence Hospital
Number of Clients Enrolled at Any Time	568	406	221
Mean Number of Months Enrolled per Client	16.5	8.7	9.8
Percentage Disenrolled by Reason			
Intervention complete	55.3	71.4	78.3
Client died before intervention complete*	27.3	26.4	14.0
Disenrolled voluntarily or became ineligible	17.4	2.2	7.7

SOURCE: AdminaStar's Patients Assisted to Healthy Hearts (PATH) database; IFMC's Catastrophic Case Management (CCM) database; Providence Hospital's Geriatric Case Management (GCM) database.

NOTES: The AdminaStar intervention was between 20 and 24 months long and ended for all clients on November 30, 1995.

For IFMC and Providence Hospital, clients enrolled during months 1 through 12 (month 12 was September 1994 for IFMC and November 1994 for Providence Hospital) and the interventions were one year long. For those enrolled during months 13 through 18, the IFMC intervention ended on September 30, 1995, and the Providence Hospital intervention ended on November 30, 1995 (and, thus, the interventions were shorter than one year).

*Mortality data from the Medicare Enrollment Database (accessed for the evaluation in August 1996) revealed the following, somewhat higher, client mortality rates between random assignment and the time case management would have ended if the client had not died: AdminaStar, 33 percent; IFMC, 29 percent; and Providence Hospital, 16 percent.

prognosis of at least six months to live, which partly explains its relatively low mortality rate. The disenrollment rate over the two-year waiver period was just two percent for IFMC and eight percent for Providence Hospital. The IFMC mortality and disenrollment rates did not change much during the two-year waiver period. The Providence Hospital rates were slightly higher during months 7 through 18 than they were earlier or later. However, this was likely due to the volatility of the relatively smaller Providence Hospital caseload.

The AdminaStar intervention, meant to last two years (but only 20 months for clients who entered the project in the second enrollment wave), had disenrollment and mortality rates roughly comparable to those of Providence Hospital. On average, clients spent 16.5 months in the project. AdminaStar's mortality rate during the intervention was 27 percent and its disenrollment rate 17 percent. These rates correspond roughly with the rates for Providence Hospital, after the difference in the length of the interventions is taken into account. Among AdminaStar disenrollees, only about two-thirds actively declined service, while the other third became ineligible (for example, by moving out of Indiana) or could no longer be reached by telephone by the case managers. These rates did not change much during the two years of the waiver.⁴

AdminaStar clients who completed the intervention tended to be younger, less likely to be receiving Medicaid benefits, and relatively healthier than those who disenrolled (see Table III.6).⁵ This finding is

⁴Mortality rates cited above are based on project databases. Mortality data from the Medicare Enrollment Database (accessed for the evaluation in August 1996) revealed somewhat higher rates of mortality between random assignment and the time case management would have ended if the client had not died: 33 percent for AdminaStar clients, 29 percent for IFMC, and 16 percent for Providence Hospital. Case managers probably were unaware of the deaths of a small number of clients they could not contact. Client mortality rates during the first year after project enrollment were 19 percent for AdminaStar, 28 percent for IFMC, and 17 percent for Providence Hospital. (The IFMC and Providence Hospital one-year rates differ slightly from the rates measured between random assignment and the time case management would have ended if the client had not died because they are based on slightly different client groups. The AdminaStar rate differs substantially because case management could have lasted between 20 and 24 months.)

⁵Comparisons in Table III.6 are between clients who completed project interventions and those who voluntarily disenrolled. Clients who died during the intervention were excluded because they were likely to have had markedly different characteristics from either of these groups.

TABLE III.6

CHARACTERISTICS OF CLIENTS WHO COMPLETED AND DISENROLLED FROM DEMONSTRATION PROJECTS

	Administar		IFMC		Providence Hospital	
	Completers	Disenrollees	Completers	Disenrollees	Completers	Disenrollees
Characteristics from Medicare Files						
Percentage Age 85 or Older	12.9*	21.4	18.0	12.5	17.2	13.3
Percentage with Medicaid Buy-In for Medicare A or B	10.0*	18.4	15.7	0.0	3.1	13.3
Percentage Receiving Medicare Services During First Six Months After Random Assignment						
Any inpatient	24.4***	48.0	40.8	62.5	39.3**	73.3
Any skilled nursing facility	2.6**	10.2	10.9	0.0	9.8	20.0
Any home health	17.0*	26.5	38.2	37.5	53.4	73.3
Medicare Reimbursement During First Six Months After Random Assignment (Dollars)						
Part A	2,000**	6,218	5,111	7,941	6,852**	18,255
Part B	1,028**	1,535	2,406***	784	2,498**	5,706
Total Parts A and B	3,028**	7,754	7,517	8,726	9,351**	23,961
Medicare Number of Observations^a	311	98	267	8	163	15
Characteristics from Follow-Up Survey (Percentages)						
Graduated from High School	55.6	43.7	55.9	83.3	61.1	62.5
Household Income Less Than \$20,000 Last Year	74.9	79.5	80.4	100.0	63.2	57.2
Currently Married	51.3**	31.4	46.3	50.0	52.4	75.0
Found Arranging for Services Difficult or Needed More Personal Care or Help Around the House During Past Six Months	24.6***	49.0	26.4	28.6	45.2	37.5
Received Paid Assistance with Personal Care, Help Around the House, Meal Preparation, or Transportation to Medical Appointments During Past Six Months	25.1	33.3	35.7	66.7	44.6	37.5
Survey Number of Observations^b	199	51	258	7	168	8

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996; 1992 through 1995 National Claims History files. Evaluation's six-month follow-up telephone survey of clients (and control group members) fielded between May 1994 and November 1995.

TABLE III.6 (continued)

NOTE: The Medicare service use and reimbursement period of observation for AdminaStar is the six months after December 17, 1993, for the first wave of identified beneficiaries and is the six months after April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for clients in the IFMC and Providence Hospital projects is the six months after the date of random assignment if the client was randomized after hospital discharge (or was a Providence Hospital community referral), but the six months after the day after hospital discharge if the client was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

Variables describing ability to arrange for services and use of services are measured after random assignment and, thus, may have been affected by participation in case management project. They are presented here solely to compare project client caseloads.

^aExcludes clients with no match to Medicare eligibility files, with no Medicare-covered hospitalization on claims files (other than for Providence Hospital community referrals), or who died prior to random assignment (12 AdminaStar clients, 30 IFMC clients, and 12 Providence Hospital clients). Top panel also excludes clients who died during the intervention period.

^bStudy group sizes are numbers of clients responding to survey. Maximum item nonresponse for questions in this table for AdminaStar was 27 observations; for IFMC, 33; and for Providence Hospital, 25. Bottom panel also excludes clients who died during the intervention period.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

consistent with the earlier findings that beneficiaries *who refused to participate* in the AdminaStar project were older and less healthy than those who consented. Completers were only half as likely as disenrollees to have been hospitalized during the six months following enrollment. Similarly, they had much lower rates of SNF and home health use and much lower Medicare reimbursements. Completers also had higher levels of functional independence, as measured by project assessment tools at enrollment (see Appendix Table B.6). For example, only about a quarter of completers were found to have marked limits in their ability to perform physical activities, as measured by the New York Cardiac Classification, compared with nearly half of the disenrollees. (There were no differences, however, between completers and disenrollees with respect to mental function, the availability of informal support, or tobacco or alcohol consumption.) Completers were more likely than refusers to be married (Table III.6) and less likely to have had difficulty arranging for services during the six months following random assignment.⁶

Disenrollment rates at the other two projects were too low to warrant useful comparisons of project completers and disenrollees. Only 9 IFMC clients and 17 Providence Hospital clients disenrolled. The only noteworthy difference is that, in both projects (as in AdminaStar), the disenrollees were much more likely to have been hospitalized during the first six months following enrollment. (Appendix Tables B.7 and B.8 provide tabulations of the data collected by the projects at intake for completers and disenrollees.)

The higher disenrollment rate for the AdminaStar project most obviously reflects the greater length of the intervention. The higher rate potentially also resulted from the longer time between a prior hospitalization and enrollment (and, thus, a decreased sense of urgency among beneficiaries about the need to continue to participate) and the project's lack of in-person contact. AdminaStar staff reported that most voluntary disenrollments came shortly after random assignment and were primarily due to clients misunderstanding the nature of the project when they had originally consented to participate (for example,

⁶Survey data describing client functioning six months after random assignment also confirmed the findings of data from the project's initial assessment that disenrollees had higher levels of physical disability than completers. (These survey data were not tabled.)

believing the project would send nurses to their homes). In all three projects, the clients who had health problems serious enough to warrant a hospitalization were more likely to leave the project. We cannot assess whether this was because these clients felt the project did not meet their particular needs or because they felt too ill to interact with the case managers.

C. CASE MANAGEMENT IMPLEMENTATION

1. Case Management Service Delivery

Case managers provided health-related education, gave emotional support to clients and caregivers, and recommended and arranged for support services. Projects varied in the extent to which these activities were documented in the project databases made available to the evaluation. AdminaStar provided a focused, systematic educational intervention to each client with every contact, but these efforts were not recorded in case management plan data. IFMC also provided education to each client during at least some of their contacts, but in a less formal way, and educational efforts were not recorded on the IFMC database. Providence Hospital did record educational efforts on its database. Just over 80 percent of clients received health education. Not surprisingly, none of the project databases reflect efforts to provide emotional support to clients and caregivers.

Case managers (or, at AdminaStar, the social worker) made recommendations and arranged for support services such as transportation to medical appointments, home-delivered meals, homemaker services, and assistance with purchasing medications. Differences across the interventions were marked in the relative focus on arranging support services versus providing education. Of the three projects, Providence Hospital placed the greatest emphasis on service arranging, while AdminaStar placed the least emphasis on it. IFMC appeared to be somewhere in between.

The level of support services project clients used, however, appeared to be related largely to their levels of disability rather than to the focus of the planned intervention. Both AdminaStar and IFMC clients appeared to use relatively few support services, very likely because roughly two-thirds were assessed as

not requiring help with the types of activities that lead to support service use.⁷ Fewer than half of all AdminaStar clients were recommended for any of the services documented in the AdminaStar database (homemaker services, home-delivered meals, transportation, assistance with purchasing medications, psychosocial counseling, and other non-Medicare-covered services) at any time during the intervention (see Table III.7). Most of their support service use was for homemaker and meal services. (Case managers commented that some of this service use reflects the use of maids by clients without substantial disability.) Similarly, only eight percent of IFMC clients had a recommendation for home-delivered meals and only six percent had a recommendation for homemaker services or transportation documented in the project database at any time during the intervention. However, 24 percent of IFMC clients were recommended for home health aide services (which often include homemaker services, as well as assistance with personal care or routine medical treatments). The IFMC database primarily documented the receipt of more medically oriented services.⁸

By contrast, at enrollment more than half of Providence Hospital clients required some help with personal care or ambulation, and more than 85 percent required assistance with shopping or managing money (see Appendix Table A.10). Thus, it is not surprising that 37 percent of Providence Hospital's clients were recommended for assistance with housekeeping, 38 percent for home-delivered meals or nutritional counseling, and 28 percent for transportation services at some time during the intervention. (See Table III.8, which also reflects that Providence Hospital case management plans, as presented in the project database, were the most comprehensive of the three projects.)

⁷Among AdminaStar clients, 70 percent required no help with activities of daily living at the time of initial assessment (see Appendix Table B.1). Among IFMC clients, 61 percent needed no help with shopping, traveling, paying bills, taking medications, preparing meals, using the telephone, or personal care (see Appendix Table B.2).

⁸The low level of support service use reported may have been partly an artifact of the IFMC project record-keeping system. Survey data describing support service use suggest 39 percent of IFMC clients received paid support services (such as personal care, help around the house, meal preparation, or transportation to medical appointments) at some time during the six months after project enrollment.

TABLE III.7

MAJOR SERVICES INCLUDED IN ADMINASTAR AND
IFMC CASE MANAGEMENT PLANS
(Percentage of Clients with Service)

	In Initial Plan	Ever in Plan
AdminaStar		
Homemaker/Maid, Companion, Home-Delivered Meals	14.3	30.6
Transportation	3.4	8.3
Assistance Purchasing Medications	1.5	8.8
At Least One Service in Plan ^a	19.0	43.8
Number of Observations^b	532	532
IFMC		
Skilled Nursing	31.2	44.4
Home Health Aide	13.2	23.6
Nursing Home	16.8	23.1
Oxygen	16.2	25.6
Nutritional Counseling and Home-Delivered Meals	4.3	7.9
Other Support Services (Including Homemaker, Transportation, and Meals)	2.3	5.8
At Least One Service in Plan ^a	58.6	74.9
Number of Observations^b	394	394

SOURCE: AdminaStar's Patients Assisted to Healthy Hearts (PATH) database; IFMC's Catastrophic Case Management (CCM) database.

^aIncludes the listed services and other types of financial assistance, psychosocial counseling, other nonspecified non-Medicare-covered services, and services that had been ordered through local Area Agencies on Aging, but not yet received. Some maid services recorded here were regarded as discretionary by the case managers (that is, not linked to disability).

^bAmong the 568 clients enrolled by AdminaStar, 36 had no case management plan because they died or disenrolled before a plan could be developed. Among the 406 clients enrolled by IFMC, 12 died or disenrolled before a plan could be developed.

^cIncludes the listed services and physical, occupational, and speech therapy; durable medical equipment; hospice; pulmonary and cardiac rehabilitation; in-home laboratory; and psychiatric treatment.

TABLE III.8
MAJOR SERVICES INCLUDED IN PROVIDENCE
HOSPITAL CASE MANAGEMENT PLANS
(Percentage of Clients with Service)

	In Initial Plan	Ever in Plan
Health Education	65.9	83.4
Health Maintenance	18.0	42.7
Durable Medical Equipment	14.2	22.3
Transportation	14.7	27.5
Nutrition	17.1	38.4
Housekeeping	19.4	36.5
Medications	12.8	29.9
Counseling	8.1	15.2
Service Coordination	10.9	15.2
Finances	7.6	14.7
Socialization	11.4	20.9
Home Health	14.7	27.5
Respite	9.5	14.2
Help Preparing Advance Directives	12.3	19.0
Physical or Occupational Therapy	10.0	15.6
Personal/Home Safety	11.4	24.6
Advocacy	1.4	13.3
At Least One Service in Plan ^a	88.6	94.8
Number of Observations^b	211	211

SOURCE: Providence Hospital's Geriatric Case Management (GCM) database.

^aIncludes the listed services and medical supplies, dental services, housing assistance, and adult day care.

^bAmong the 221 clients enrolled by Providence Hospital, 10 died or disenrolled before a plan could be developed.

2. Case Manager Activities

Case managers carried out two basic types of beneficiary-specific activities: (1) preenrollment activities (identifying potentially eligible beneficiaries, verifying eligibility, and obtaining informed consent), and (2) case management itself (assessing clients, planning services, providing education and emotional support, and arranging for and monitoring support services). Providence Hospital case managers conducted a third beneficiary-specific activity: performing a brief assessment on all consenting eligible beneficiaries (including those who became control group members) before random assignment and assessing control group members again one year later. They did this to provide information about control group members and clients on changes in status. In the discussion that follows, “beneficiary-specific case management activities” refer to those activities for which time is recorded on specific beneficiary records on project databases. Case managers also performed nonclient-specific activities, such as attending staff meetings and training sessions and gathering information for the benefit of the caseload as a whole.

a. AdminaStar

The AdminaStar project planned to enroll 550 clients, giving case managers caseloads of about 80 to 85 clients each. The project enrolled 568 clients and had seven full-time case managers (including the supervisor, who also had her own caseload). Thus, when enrollment was at its height, caseload size averaged 81 clients. All client contact was by telephone or mail. The assigned case management level determined the frequency of contact. At the end of the first waiver year, case managers reported that an average client contact took 20 to 25 minutes and that they made an average of seven calls a day. During a typical day, in addition to contacting clients, case managers documented calls on the computer, called physicians (or their designated staff) and home health agency staff on behalf of clients, sent materials to clients, and sent reports to physician staff. They also worked on the project’s quarterly newsletter and developed other educational tools such as an information sheet on Coumadin (a blood thinner commonly used by individuals with CHF) and a cookbook.

AdminaStar case managers recorded 5,752 hours of beneficiary-specific time on the project database (see Table III.9). This appears to be only a small proportion of their available work time. If a full-time employee worked roughly 4,000 hours over two years (40 hours per week for 50 weeks each year), then seven full-time workers would work roughly 28,000 hours. The recorded hours represent only about 20 percent (or one day a week) of that. This low rate either reflects the fact that the case managers spent a lot of time on tasks that were not linked to specific clients (as described earlier) or that they did not completely record the time spent with specific clients. Making seven contacts of between 20 and 25 minutes each would have accounted for between 27 and 37 percent of their time. Thus, it seems likely that case managers both underreported client-specific time on the database and spent substantial time on activities not linked to specific clients. It is also possible that, because client contact was highly structured and primarily by telephone, fewer case managers with larger caseloads might have been more efficient. (At the end of the demonstration, staff reported that caseloads of 85 to 100 would have been manageable after preenrollment activities had been completed.)

Nearly all of 5,752 recorded beneficiary-specific hours (96 percent) were spent on case management. Because potential clients were identified through the review of claims data, case managers spent relatively little time (four percent), all early in the waiver period, verifying the eligibility of consenting beneficiaries. AdminaStar, with 568 clients enrolled for up to two years of intervention, accumulated the highest number of client months (9,381) of the three projects.⁹ On average, the seven case managers spent 36 minutes providing case management services to each client each month. This includes the time spent by the project social worker arranging services through local AAAs. (The social worker, who was part-time, spent an

⁹Client months are the total number of months all clients were enrolled in the project. In accumulating client months for the project, clients enrolled during an entire month contributed one month to the total, while those who enrolled, disenrolled, or died during the month contributed that fraction of the month during which they were actually enrolled.

TABLE III.9

BENEFICIARY-SPECIFIC HOURS RECORDED ON PROJECT DATABASES, BY ACTIVITY TYPE

Beneficiary-Specific Hours						
Total Hours	Preenrollment* (Percentages of Total)	Enrollment and Disenrollment* (Percentages of Total)	Case Management (Percentages of Total)	Client Months Enrolled ^d	Total Hours per Client Month ^e	Case Management Hours per Client Month ^e
AdminaStar						
5,752	207 (3.6)	NA	5,544 (96.4)	9,381	0.6	0.6
IFMC						
8,190	3,849 (47.0)	NA	4,340 (53.0)	3,540	2.3	1.2
Providence Hospital						
5,175	1,223 (23.6)	630 (12.2)	3,321 (64.2)	2,169	2.4	1.5

SOURCE: AdminaStar's Patients Assisted to Healthy Hours (PATH) database; IFMC's Catastrophic Case Management (CCM) database; Providence Hospital's Geriatric Case Management (GCM) database.

*Preenrollment activities include identifying potentially eligible beneficiaries and verifying their eligibility.

^bEnrollment and Disenrollment activities apply only to Providence Hospital and include assessments performed on clients and control group members prior to random assignment and on control group members one year after random assignment.

^cClient months are the total number of months all clients were enrolled in the project. In accumulating client months for the project, clients enrolled during an entire month contributed one month to the total, while those who enrolled, disenrolled, or died during the month contributed that fraction of the month during which they were actually enrolled.

^dTotal Hours per Client Month equals Total Hours divided by Client Months Enrolled.

^eCase Management Hours per Client Month equals Case Management hours divided by Client Months Enrolled.

NA = not applicable

average of roughly 14 hours a month working on behalf of specific clients and, early in the project, verifying eligibility of consenting beneficiaries).

b. IFMC

The IFMC project planned to enroll 400 clients, giving case managers caseloads of 100 clients each. The project enrolled 406 clients and had four full-time-equivalent case managers. Thus, caseload size was as planned. Most client contact following enrollment was by telephone. At the end of the first waiver year, case managers reported that clients were contacted, on average, every 10 to 14 days (although clients with very unstable conditions were called daily). A typical workday for the case managers during the 18-month enrollment period started with downloading information (from the case manager's laptop) needed to conduct the day's work (this took about an hour). They spent the next four hours calling clients, changing service arrangements, and preparing paperwork for providers. (Calls to clients always included a checklist of items to informally reassess clients and frequently included the provision of emotional support and education.) Case managers spent the rest of the day on screening and enrollment activities at referring hospitals and on an occasional visit to a client's home or to an appointment with a physician.

IFMC case managers recorded 8,190 hours of beneficiary-specific time on the project database. This is just over half the total time they spent at work if one assumes that a full-time worker would put in 4,000 hours over two years and four workers would put in 16,000 hours. However, IFMC case managers recorded more beneficiary-specific hours than did those in the other two projects.

Just under half the recorded client-specific hours were spent verifying the eligibility of referred beneficiaries and obtaining consent. (During the first year of the waiver, case managers spent more than 60 percent of their time on this activity; during the second year, this decreased to 31 percent.) With 406 clients enrolled for, at most, one year during the two-year waiver period, IFMC client months totaled 3,540. The four full time-equivalent case managers spent, on average, 72 minutes providing case management to each client each month.

c. Providence Hospital

The Providence Hospital project originally planned to enroll 750 clients and to have nine case managers with about 80 clients each. The project ultimately enrolled 221 clients and had three case managers, yielding caseloads that averaged 74 clients each. The case manager supervisor performed the bulk of preenrollment activities for the project. The project anticipated that most client contact would be by telephone, although quarterly reassessments would be conducted in person. At the end of the first waiver year, case managers reported that roughly 20 percent of client contact was in person. They also reported that service coordination and monitoring took up most of their time. (This is not surprising, given the focus of the intervention.)

Providence Hospital case managers recorded 5,175 hours of beneficiary-specific time on the project database. This is 32 percent of the total time they spent at work if one assumes that a full-time worker would put in 4,000 hours over two years and four workers would put in 16,000 hours. (This increases to 43 percent if one excludes the available time of the case manager supervisor, who conducted preenrollment activities for specific beneficiaries and general marketing for the project).

A quarter of the recorded beneficiary-specific hours was spent identifying potentially eligible hospital patients, verifying their eligibility, and obtaining consent. Twelve percent of the time was spent on prerandom assignment assessments and one-year reassessments of control group members. With 221 clients enrolled for, at most, one year during the two-year waiver period, this project's client months totaled 2,169. The three case managers spent, on average, 90 minutes providing case management to each client each month.

3. Appropriateness of Case Management

The evaluation included a review of case notes for 10 randomly selected clients at each of the three projects. The purpose of the review was to determine (given the clients' conditions) whether the case management plans were appropriate and implemented as intended and (given the passage of time and

events) whether the responses of case managers were appropriate. To review case notes systematically, we developed “ideal generic case management plans” for the three diagnoses chosen for review (CHF, COPD, and stroke).¹⁰ The generic plans identified the types of activities the projects had planned to undertake: teaching, providing emotional support, advocacy, monitoring, and service arranging and coordinating. We also developed a list of events that could be expected to prompt a response from case managers. These included changes in client symptoms or functioning, changes in caregiver status, a visit to a physician or emergency room, a hospital admission or discharge, a nursing home admission, and major problems with service delivery. (See Appendix B for the forms developed for this review.) The nurse consultant to the evaluation conducted the review. As with any type of records review, the quality and completeness of the case notes affect the conclusions.

Review of the case notes underscored the differences in the approaches that each project took to case management. In general, however, these differences appeared to be appropriate to the clients served by each project. The AdminaStar project was intended to teach clients about CHF and help them learn to monitor their symptoms. The case notes for selected clients reflected a consistently high level of teaching and monitoring. Service arranging, however, occurred in only about two-thirds of the instances in which it seemed appropriate.¹¹ Nearly 80 percent of the time, case managers responded to events that should

¹⁰Client selection was stratified as follows. Among AdminaStar clients, five were selected from the first enrollment wave, five from the second (all had CHF). Among IFMC clients, five with CHF and five with COPD were selected. All were enrolled between April 1994 and September 1994. Similarly, among the Providence Hospital clients, five with CHF were selected (to allow some comparison to the other projects) and five with stroke (since the project’s COPD target group was small and its intervention well suited to clients who had had strokes). All were enrolled between June 1994 and November 1994. The start dates were six months after project startup, to reflect case management activities after an initial start-up period. The end dates were chosen to ensure the clients had been in the project at least six months when the projects sent the evaluator the case notes.

¹¹The cases for which needed arranging did not occur were for services such as those of a dietitian. The AAAs on which the project relied for service arranging do not typically cover dietitian services.

have triggered their response. (Among AdminaStar clients, most of these events were hospitalizations or physician visits.)

The IFMC project emphasized client monitoring and condition-specific teaching following a recent hospital discharge. However, this did not take the form of systematic and standardized teaching, as in the AdminaStar project. Case notes suggested that case managers closely monitored their clients' symptoms and medical management. Case managers performed more than 80 percent of expected monitoring activities. The frequency of monitoring was highly variable, however, and sometimes seemed more frequent than necessary (perhaps this was because the project provided no guidelines as to how often to monitor clients). Service arranging occurred in more than 95 percent of the instances in which it seemed appropriate. Appropriate case management response to important events occurred more than 80 percent of the time. (Among IFMC clients, most of these events were hospitalizations or physician visits.)

The Providence Hospital case managers took a less medical approach to their intervention. Case notes suggested theirs was closer to a traditional long-term care case management intervention. Emphasis was on preventing further hospitalizations by providing advocacy and in-home service arranging and coordination. The case managers monitored the clients' conditions in general, including the home situation and service delivery, but they did not monitor specific symptoms. Case notes reflected that condition-specific teaching occurred only in just over half of the instances in which it might be expected. (Not surprisingly, the nurse case manager did more teaching than the social worker case manager.) Case managers performed nearly all expected monitoring activities, but the overall frequency of monitoring was less than in the other two projects. This probably was appropriate, however, because (according to the notes) nearly two-thirds of the clients had home health nurses visiting them. Case managers may have assumed that home health nurses would provide condition-specific teaching to project clients. Coordination, advocacy, and service arranging levels occurred in more than 90 percent of the instances in which it seemed appropriate. The range of services Providence Hospital clients used was much broader

than the range of services clients of the other two projects used. As in the other two projects, case managers responded to events that should have triggered their response just over 80 percent of the time. However, the number of events among Providence Hospital clients was much higher. (The types of events for clients of the Providence Hospital project tended to concern hospitalizations or physician visits. However, there also were substantially more changes in informal caregivers and problems with service delivery than at the other two projects.)

Case notes review revealed that, when the projects established policies, protocols, or standard forms requiring certain activities, these activities were carried out. Without this type of support, however, some activities were overlooked. For example, the AdminaStar protocol included efforts to encourage clients to have pneumonia immunizations and annual flu shots, both of which could have been lifesaving for their clients. At the other projects, these efforts were not systematic (although their clients also would have benefited from these preventive measures). Similarly, the Providence Hospital project made a systematic effort to develop emergency plans for their clients and identify whether they had prepared advance directives.

In general, the approach of each case management project appeared to match the needs of the clients it enrolled. (Case notes did reveal, however, that one AdminaStar client required a more intense in-person intervention, rather than primarily teaching, and one Providence Hospital client needed more condition-specific teaching.)

4. Attitudes Toward Case Management

A substantial proportion of clients reported that case management had improved self-care, and a smaller proportion reported that it had improved access to medical and support services. Most physicians initially showed little enthusiasm for the case management project. However, many of those whose patients became project clients believed project services helped their patients.

a. Clients

Consistent with the relative emphasis of the AdminaStar project on teaching self-care, 81 percent of its clients who completed the evaluation's six-month follow-up survey reported that the project had improved their ability to care for themselves (see Table III.10). The percentages reporting improved self-care were lower, but still substantial, for clients of the other two projects: 68 percent for IFMC clients and 72 percent for Providence Hospital clients.

However, much smaller percentages of clients reported that the projects had improved access to needed medical and support services (for example, medical or personal care, transportation to medical care, assistance with filling prescriptions, or help in obtaining answers to condition-specific questions). The percentage was highest for the Providence Hospital project, which had the strongest focus on service arranging and highest number of case management hours per client. A third of all Providence Hospital clients reported that the project increased their access to services, compared with just under a quarter of IFMC clients and just over a tenth of AdminaStar clients.

The extent to which a project increases access to support services for its clients depends, in part, on the extent to which its clients require those services. The evaluation had no direct measure of this type of need. However, a proxy measure was constructed from follow-up survey responses that indicated either (1) that a client had difficulty arranging for support services or felt he or she needed more service, or (2) that a client reported receiving paid support services. As noted earlier in this chapter (and shown in Table III.10), levels of these measures differed by project. Providence Hospital clients had the highest level of need; among those clients in need, 38 percent reported that the project increased access to services. However, only just over a quarter of IFMC clients who needed support services felt that the project increased their access to them. The comparable figure for AdminaStar clients was about 15 percent.

TABLE III.10
CLIENT SATISFACTION WITH CASE MANAGEMENT PROJECTS
(Percentages)

	AdminaStar	IFMC	Providence Hospital
Project Improved Self-Care (percentage among all clients)	81.2	68.3	72.3
Project Increased Access to Needed Care			
Percentage among all clients	12.4	23.3	32.5
Percentage among clients who needed support services during past six months ^a	14.7	27.1	38.0
Number of Observations^b	328	363	204

SOURCE: Evaluation's six-month follow-up telephone survey of clients (and control group members) fielded between May 1994 and November 1995.

^aThe percentages of clients *who needed support services* during the past six months were: 49 for AdminaStar, 53 for IFMC, and 64 for Providence Hospital. The measure indicating that a client needed support services is a proxy for need per se based on the following survey responses: (1) the client had difficulty arranging for support services or felt he or she needed more services during the past six months; or (2) the client reported receiving paid services during the past six months such as personal care, meal preparation, or transportation to medical appointments.

^bStudy group sizes in table are numbers of clients responding to survey. Maximum item nonresponse for individual survey questions in this table for AdminaStar was 22 observations; for IFMC, 45; and for Providence Hospital, 16.

While clients believed the projects improved self-care, they did not believe the projects increased access to support and medical services overall or among those clients who actually used such services or felt they had difficulty gaining access to them.¹² This was true even in the Providence Hospital project, which placed the greatest emphasis on service arranging (although the Providence Hospital project did increase access for a substantially higher proportion of its clients than did the other two projects). During site visits, staff members from each project reported that waiting lists (often quite long) existed for agencies that provide support services. Thus, despite their best efforts, project case managers may have been able only to get clients on waiting lists for services, not to increase access to them.

b. Physicians

Each project found providers, especially physicians, to be less interested in or receptive to the project than it had hoped. There were likely several reasons for their general lack of interest. Physicians were offered no financial incentives to cooperate and most viewed the project as they did insurance companies and managed care organizations—as intrusions on their practice. Community physicians were not involved in planning projects and post hoc efforts to educate physicians about the projects were largely unsuccessful. Case managers conducted most outreach to physicians, rather than enlisting physician opinion leaders to encourage the cooperation of community physicians.

AdminaStar had a secondary goal of educating physicians about recent CHF treatment breakthroughs and generally hoped to foster a spirit of collaboration between case managers and physicians. The project tried to develop a physician-friendly intervention; it received little response from physicians, however, and much of the response it did receive was negative. Most dealings between the case managers and physicians were with office staff such as nurses. Furthermore, case managers believed that the physicians probably never saw the literature sent to their offices.

¹²In fact, as we discuss in Chapter VI, the projects did *not* generally improve client self-care relative to that of control group members.

IFMC both wished to foster an atmosphere of collaboration with physicians and required physician permission to approach potential clients. However, the physician refusal rate among eligible beneficiaries was 43 percent, much higher than anticipated. Project staff (as well as professionals external to the project) attributed this to the IFMC PRO's "punitive" reputation among physicians.

At Providence Hospital, the physician refusal rate among eligible beneficiaries (although lower than for IFMC), was substantial (19 percent). Project staff believed some physicians did not agree with targeting criteria and thought their patients to be either too well or too ill for the project. Others did not like random assignment and believed it would be harmful to relationships with their patients.

In spite of this initial antagonism (or lack of interest), physicians who did get involved with each project seemed pleased that the case managers were providing followup and reiterating education in a way that they and their office staff could not. IFMC and Providence Hospital staff members noted that physician attitude improved during year 2. Several physicians interviewed for the evaluation's case study remarked they initially feared loss of control over their patients to the projects, but later came to view the case managers as useful allies, who, by fielding questions from their patients, saved the physicians valuable time.

D. CASE MANAGEMENT COSTS

Projects submitted operational budgets to HCFA for each of the two demonstration years. Year 1 budgets ranged from \$404,804 for IFMC, to \$576,453 for Providence Hospital, to \$764,359 for AdminaStar (see Table III.11). Year 2 budgets ranged from \$465,799 for IFMC, to \$475,396 for Providence Hospital, to \$925,722 for AdminaStar. On average, budgets allocated between \$1,829 and \$3,073 per anticipated client over the two years, with the lowest per-client budget for Providence Hospital and the highest for AdminaStar.¹³

¹³The target enrollment for Providence Hospital was 750 clients during waiver year 1, reduced to 400 clients during year 2. For our discussion of anticipated per-client costs over the two waiver years, we took the average of the two targets, 575 clients.

TABLE III.11
COMPARISON OF PROJECT BUDGETS AND COSTS

	AdminaStar	IFMC	Providence Hospital
Budget Assumptions (Dollars)			
Demonstration Year 1	764,359	404,804	576,453
Demonstration Year 2	925,722	465,799	475,396
Total Demonstration Years 1 and 2	1,690,081	870,603	1,051,849
Dollars per Anticipated Client ^a	3,073	2,177	1,829
Invoiced Costs for Waiver Years 1 and 2^b			
Total Cost (Dollars)	1,217,069	673,151	808,423
Total Cost as Percentage of Total Budget	72.0	77.3	76.9
Case Manager Cost (Dollars) ^c	623,364	226,952	264,543
Case Manager Cost as Percentage of Total Cost	51.2	33.7	32.7
Maximum Number of Clients Enrolled	568	406	221
Client Enrollment as Percentage of Target	103.3	101.5	55.3
Total Cost per Enrolled Client (Dollars)	2,143	1,658	3,658
Mean Months Enrolled per Client	16.5	8.7	9.8
Total Client Months	9,381	3,540	2,169
Total Cost per Client Month (Dollars)	130	190	373

SOURCE: Budgets and invoiced costs come from project invoices to HCFA. Enrollment information comes from AdminaStar's Patients Assisted to Healthy Hearts (PATH) database, IFMC's Catastrophic Case Management (CCM) database, Providence Hospital's Geriatric Case Management (GCM) database.

^aAnticipated client enrollment for AdminaStar was 550; for IFMC was 400; for Providence Hospital during waiver year 1 was 750; for Providence Hospital waiver year 2 was 400. Dollars per Anticipated Client for Providence Hospital assumes an average anticipated enrollment of 575 clients.

^bDemonstration period began on October 1, 1993, for all projects. Demonstration period ended on September 30, 1995, for IFMC and on November 30, 1995, for AdminaStar and Providence Hospital. Invoiced costs for years 1 and 2 include the two-month extension for AdminaStar and Providence.

^cCase manager costs include salaries for case managers, case manager supervisors at AdminaStar and Providence Hospital, and the AdminaStar social worker.

The projects each spent roughly three-quarters of their total year 1 and 2 budgets. Project costs were reimbursed monthly (up to the limit of the total yearly budget) on the basis of invoices to HCFA, beginning in October 1993. Invoices included the case manager salaries, salaries of other staff (including the project and medical directors, clerical staff, and other support staff), other direct costs, fringe benefits, and overhead. (Overhead rates ranged from 15 percent for AdminaStar, to 22 percent for Providence Hospital, to 34.8 percent for IFMC.) Case manager salaries made up between 33 and 51 percent of total costs.

Providence Hospital—the smallest project, with a maximum enrollment of 221 clients—had the highest cost per client, at \$3,658 (double their budgeted amount) and the highest cost per client per month enrolled, at \$373. AdminaStar—the largest project, with an enrollment of 568—had moderately high per-client costs (\$2,143, or roughly two-thirds of its budget). Because AdminaStar clients were enrolled for substantially longer than clients of the other projects, however, it had the lowest cost per client per month, at \$130. IFMC had the lowest per-client cost (\$1,658, about three-quarters of its per-client budget) but moderate costs per client per month (\$190).

Providence Hospital's high per-client costs are attributable to two factors. First, the cost of activities such as case finding, eligibility verification, and obtaining consent was spread over relatively few clients. The costs of assessing control group members prior to random assignment and one year later (activities not undertaken by the other two projects) and other fixed costs were also spread across relatively few clients. Second, the Providence Hospital intervention had the most in-person contact and highest level of time-consuming service coordination. (Providence Hospital case managers recorded spending 1.5 hours performing case management with each client each month, compared with 1.2 hours for IFMC and 0.6 hours for AdminaStar.) By contrast, AdminaStar had the lowest cost per client per month because it had very low preenrollment costs (having identified potential clients through claims review) spread across the largest number of clients and the least intense intervention in the amount of time case managers spent with each client.

E. EXPECTATIONS CONCERNING THE RELATIVE EFFECTIVENESS OF THE PROJECTS

Examination of patterns of Medicare-covered service use by control group members clearly suggests that all three projects identified as clients groups of beneficiaries who, in the absence of the demonstration, were highly likely to be hospitalized and have extraordinarily high health care costs during the demonstration period.

Agency for Health Care Policy and Research guidelines for heart failure are emphatic in their recommendations for improved education and counseling for individuals with heart failure. The self-care literature underscores the need for improved education concerning symptom prevention and control for all individuals who live with chronic illness. Similarly, the providers we spoke with during case study interviews all believed that individuals with chronic illnesses, and elderly individuals in particular, required much more teaching of self-care than physicians or even home health nurses had time to provide. Thus, an effective educational intervention should be critical to the overall effectiveness of the demonstration projects.

By contrast, the voluminous literature on the provision of support services to frail elderly individuals has not demonstrated that the provision of such services can reduce overall health care spending. This is because the costs of these services seldom outweigh any small reduction in spending (say, for hospital services) that might accompany their use. On the other hand, facilitating the provision of support services to individuals who require them can reduce unmet need and increase overall satisfaction with health care and with life more generally.

Because all three projects contained both education and service-arranging components, all had the potential to succeed in improving client health and reducing costs. Because of its highly structured, focused educational approach, however, the AdminaStar project most likely would be the most effective, if case managers successfully delivered their educational message over the telephone. The Providence

Hospital project's high costs suggest that, even if it reduced health care spending, such reductions would have to be quite large to offset the cost of its intervention.

IV. DATA AND METHODOLOGY FOR IMPACT ANALYSES

The evaluation used random assignment to develop a control group, statistically equivalent to project clients, to reflect what would have happened to clients if they had not received case management. With random assignment, the simple differences between client and control groups in mean outcomes provide unbiased estimates of demonstration impacts. We used regression approaches to estimate impacts, however, because they provide more precise estimates and control for chance differences between client and control groups on measured predemonstration characteristics that could influence outcomes.

The impact analyses use data from a variety of sources. Service use and reimbursement data from Medicare claims files furnished most dependent variables for the use and cost impact analyses, as well as serving as proxy measures for some quality outcomes. The evaluation's six-month follow-up telephone survey asked respondents about the key outcome measures used for assessing project impacts on the quality of care: various condition-specific self-care behaviors and symptoms, functioning, and satisfaction with care. Regression control variables include (1) beneficiary-level Medicare service use and reimbursement prior to enrollment in the demonstration, (2) a small number of survey questions describing clients and control group members at enrollment, (3) a few data items collected by demonstration projects prior to random assignment, and (4) some county-level environmental descriptors taken from the Area Resource File (ARF).

We also collected Medicare claims and eligibility data and some project data on beneficiaries who were eligible to participate in the demonstration but chose not to. These data were used to assess the types of beneficiaries most (and least) interested in case management and were described in Chapter II.

A. DATA SOURCES AND STUDY GROUPS

Two basic study groups were used to conduct the impact analyses. One was a Medicare claims-based group that included almost all beneficiaries randomly assigned to client or control status by the

demonstration projects, excluding only those beneficiaries who could not be matched to Medicare eligibility or claims files. The second was a survey-based group that included that subset of randomly assigned beneficiaries who completed the evaluation's six-month follow-up survey.

Demonstration project databases provided the evaluation with Medicare beneficiary health insurance claim (HIC) numbers and other identifying information describing all beneficiaries initially screened for the projects. This group includes consenting eligible beneficiaries who were randomly assigned to the client or control group, as well as ineligible and eligibles who declined to participate. The identifying information from the projects was the basis both for our request to HCFA for Medicare eligibility and claims data and for our telephone survey contacts.

1. Medicare Eligibility and Claims Files

Medicare HIC numbers and other identifying information from the demonstration projects were used to develop a finders file, or list of beneficiaries for whom Medicare data were requested. (Medicare HIC numbers for clients and control group members were validated by HCFA's Bureau of Data Management and Strategy.) Claims data were extracted from the Standard Analytic Files in May 1996. Assuming a four-month lag between the receipt of a Medicare-covered service and its appearance on these files, claims data may be considered complete for services received through December 1995. At the same time, Medicare eligibility data were extracted from the Health Insurance Skeleton Eligibility Write-off (HISKEW) file archived at the end of March 1996.¹

Medicare eligibility data provided demographic characteristics (age, sex, and race) of beneficiaries as well as dates of death, Medicare entitlement, and HMO enrollment, reason for original Medicare entitlement, and Medicaid buy-in status. Medicare claims data were used to construct measures of

¹HMO enrollment dates, not contained in HISKEW files, were downloaded from the Enrollment Data Base (EDB) in September 1996. In addition, it appeared that dates of death on the March 1996 HISKEW only went through early 1995. We therefore downloaded more recent dates of death from the EDB at the same time as the HMO data download.

Medicare-covered service use and reimbursement by type of service (inpatient hospital, skilled nursing facility, home health, hospice, outpatient hospital, and physician and other Part B providers) during the year before demonstration enrollment and the year following enrollment. Because claims data were complete only for services received through December 1995, a full year of postenrollment data were available only for beneficiaries who enrolled in the demonstration through December 1994 (as described further later). Six months of postenrollment data were available for all enrollees, however.

Unless the beneficiary was hospitalized at the time, reference periods for Medicare claims-based constructs for clients and control group members were defined by the date the beneficiary was randomly assigned to client or control status. If the beneficiary was hospitalized on the day of random assignment, the constructs were defined by the day after hospital discharge. We defined reference periods this way because, in practice, case management did not begin until the stay that identified a potential client to the project was over. Thus, the costs of the identifying hospitalization, which may have been substantial, were counted as preenrollment costs.² (Roughly half of all client and control group members were randomized during an identifying hospitalization.) We constructed Medicare service use and reimbursements during the year prior to the reference date (disaggregated into the 2 months immediately before the reference date and the 10 months before that) and during the year following the reference date (disaggregated into the first 3 months, second 3 months, and final 6 months). As noted earlier, data describing the final six months were not available for beneficiaries who enrolled in 1995.

Postenrollment data were truncated for beneficiaries who joined HMOs during the postenrollment period. HMO enrollment causes truncation because HMOs are not required to submit person-level,

²If the interventions had explicitly included discharge planning, we would have measured outcomes from the date of random assignment. Discharge planning was left largely to the hospital discharge planners, however, and the interventions did not begin until the client was discharged from the stay that identified the client to the project. Thus, we measure outcomes from that date forward. This approach ensures that large costs and hospital days that occurred before the intervention began were not included in the outcome measures.

service-specific claims to HCFA for their enrollees. Such data truncation would not threaten the validity of demonstration impact estimates if it occurred at the same rate for clients and control group members, although it would result in an understatement of service use and reimbursement. Differential client/ control mortality rates during the postenrollment period could also distort impact estimates. As reflected in Table IV.1, however, although mortality rates were high, they were not different for client and control group members. Similarly, HMO enrollment rates were very low for both groups.

Study groups for the analysis of Medicare service use and reimbursement were restricted to those beneficiaries (1) whose Medicare identifiers matched the Medicare eligibility files, (2) for whom we could identify a Medicare-covered hospitalization, and (3) who were alive on the date of random assignment.³ (A similar set of restrictions was applied to the study group for analyses based on Medicare data presented in Chapters II and III.) The following client and control impact analysis study groups resulted:

	AdminaStar	IFMC	Providence Hospital
Number of Beneficiaries Randomized to Client Group	568	406	221
Numbers of Client Group Exclusions			
No match to eligibility files	0	18	6
No Medicare-covered hospitalization	6	11	6
Died before random assignment	6	1	0
Clients for Impact Analysis	556	376	209
Number of Beneficiaries Randomized to Control Group	566	400	221
Numbers of Control Group Exclusions			
No match to eligibility files	0	22	4
No Medicare-covered hospitalization	5	13	6
Died before random assignment	5	2	0
Control Group Members for Impact Analysis	556	363	211

³Beneficiaries in the Providence Hospital community referral target group did not have to have a hospitalization to be included in analysis. Other beneficiaries were identified by the projects because they had a Medicare-covered hospital stay. Thus, if we found no such stay on the claims files, we assumed an error in matching beneficiaries to the Medicare files and dropped the beneficiary from our analyses.

TABLE IV.1
TIME AT RISK OF INCURRING MEDICARE EXPENSES

	AdminaStar		IFMC		Providence Hospital	
	Clients	Control Group Members	Clients	Control Group Members	Clients	Control Group Members
Mortality						
Percentage Who Died During First Six Months After Reference Date	9.5	8.3	19.1	18.2	8.6	4.7
Percentage Who Died During Year After Reference Date	18.5	15.8	27.9	28.7	17.2	13.7
Mean Number of Days Between Reference Date and Death for Deceased	180	183	136	152	170	188
HMO Enrollment						
Percentage Enrolled in HMO During First Six Months After Reference Date	1.1	1.1	2.9	2.5	0.0	0.0
Percentage Enrolled in HMO During Year After Reference Date	1.3	1.1	2.9	2.5	0.0	0.0
Mean Number of Days Between Reference Date and First HMO Enrollment for HMO Enrollees	32	3	0	0	NA	NA
Number of Observations^a	556	556	376	363	209	211

SOURCE: Medicare Enrollment Database (accessed in August 1996).

NOTE: Student's t-tests were used to test the equivalence of client and control group means.

^aExcludes clients and control group members with no Medicare-covered hospitalization on claims files, with no match to Medicare eligibility files, who died prior to random assignment.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

Among the 50 beneficiaries for whom no match to the Medicare eligibility files could be found, 49 were eligible for Medicare through the Railroad Retirement Board. (Other studies have noted difficulties in receiving complete Medicare data for Railroad Board retirees. See for example, Weiner et al. 1996.)

Six months of postenrollment Medicare claims data were available for the full client and control study groups. As noted, however, 12 months of postenrollment data were available only for those who enrolled in the demonstration by the end of 1994. All beneficiaries participating in the AdminaStar project enrolled by April 1994. Enrollment in the IFMC project, however, continued through March 1995 and for the Providence Hospital project through May 1995. Thus, the numbers of beneficiaries for whom we have 6 and 12 months of data are:

	AdminaStar	IFMC	Providence Hospital
Client Group--6 Months	556	376	209
Client Group--12 Months	556	300	170
Control Group--6 Months	556	363	211
Control Group--12 Months	556	290	168

The differing study group sizes give rise to differing minimum detectable responses in demonstration impact estimates. For example, the AdminaStar client and-control impact study groups are sufficient to detect a demonstration impact of 7.5 percentage points or larger with 80 percent power (for two-tailed tests at the .10 significance level on a binary variable with mean of .50). By comparison, the Providence Hospital 12-month study group can detect impacts with this level of confidence only if they are 13.5 percentage points or larger. Thus, for example, unless the Providence Hospital project reduced annual hospital admission rates, say, from 50 percent, by at least 13.5 percentage points, to 36.5 percent (a 27 percent reduction), we cannot be confident of detecting a significant effect in the Providence Hospital project with the available number of observations.

	AdminaStar	IFMC	Providence Hospital
Minimum Detectable Response in Binary Variable (80 Percent Power, 10 Percent Significance, Two-tailed Test)			
6-month impact analysis	.075	.092	.121
12-month impact analysis	.075	.102	.135

NOTE: The detectable differences are given for impacts estimated by comparing means for the client and control groups. Detectable differences from regression models will be somewhat smaller due to the reduction in variance. For example, if the regression R^2 is .20, detectable differences are about 10 percent smaller than the figures in the table (that is, about .067 for AdminaStar).

2. Six-Month Follow-Up Telephone Survey

MPR developed a 15-minute telephone survey that was administered to clients and control group members six months after their random assignment. The survey collected data not available from administrative sources such as Medicare claims (for example, measures of the use of non-Medicare-covered services and access to and satisfaction with care). The survey was meant to be completed by the clients and control group members, but a proxy respondent was used if the individual could not respond. A senior MPR researcher with extensive experience in home care developed the survey with input from a geriatrician with in-depth knowledge of the projects' target diagnoses and a registered nurse with extensive experience with case management and clinical knowledge of the target diagnoses.

Telephone interviewing began in May 1994 (6 months after the first beneficiaries were randomly assigned), and continued for 18 months.⁴ Every few months, demonstration projects submitted to MPR lists of beneficiaries who had been identified as potentially eligible to participate, including those who were found to be eligible, agreed to participate, and were then randomly assigned to the client or control group. The lists included names, addresses, and telephone numbers. Letters briefly describing the purpose of the

⁴The IFMC project started randomizing consenting eligible beneficiaries in mid-October 1993. Due to the small number of beneficiaries randomized in that month, we combined beneficiaries randomized in October and November for the first month of follow-up interviewing.

survey were sent to beneficiaries one month before the six-month interview was to occur. Interviews were carried out using computer-assisted telephone interview (CATI) software. Telephone interviewing was completed in November 1995, six months after the last consenting eligible beneficiaries were randomized.

Our initial sampling plan for the interview was to select a proportion of consenting eligible beneficiaries randomized each month, to accumulate a sample of 350 beneficiaries from the client and control groups of each project. We assumed that 300 (or approximately 85 percent) of those 350 would complete interviews, for a total of 1,800 completed interviews. This approach was taken for the AdminaStar project, which had reached its target enrollment by April 1994. As it was apparent prior to the start of interviewing that the IFMC and Providence Hospital projects were having difficulty meeting their targets, we decided to attempt to interview all beneficiaries randomized by those projects. In all, 1,969 interviews were attempted and 1,798 (91 percent) completed. Only 23 beneficiaries (one percent of those contacted) refused to be interviewed. Another 75 interviews (four percent) were not completed because the beneficiary had died within a month of random assignment.⁵ The remaining five percent could not be located or contacted by telephone.

The survey covered the following topics: satisfaction with care (including a small number of questions just for clients about attitudes toward case management), the receipt of care from physicians and their staff, and condition-specific self-care activities and symptoms. It also covered overall health, the receipt of nursing home care and home- and community-based services not covered by Medicare (including uncompensated care provided by individuals, such as family members and friends), functional status, education, and household income. The reference period for most survey questions was either the six months following random assignment or the week or month prior to interview (the interview was

⁵Because we did not expect that a client would have been affected by case management if he or she died within a month of random assignment, and to reduce burden on his or her family, we did not attempt to complete interviews with the family of beneficiaries who died within a month of random assignment. However, we did attempt to complete a subset of interview questions with family of clients and control group members who died more than a month after random assignment.

administered approximately six months after random assignment). Many survey responses were used directly as analysis outcomes; a few more complicated constructs are described in Chapters V and VI.

Study groups for outcomes based on survey data were, at most, as large as the number of completed interviews:

Beneficiaries with Completed Surveys	AdminaStar	IFMC	Providence Hospital
Client Group	328	363	204
Control Group	344	352	207

Two factors led to somewhat smaller numbers of observations for specific impact estimates. Individuals whom we could not match to Medicare eligibility files, or for whom we found no Medicare-covered hospitalization (other than Providence Hospital community referrals, for whom no hospitalization was required) were excluded (as noted in the preceding discussion of Medicare-based outcome impacts). This reduced the survey study groups as follows:

Beneficiaries with Completed Surveys and Medicare Data	AdminaStar	IFMC	Providence Hospital
Client Group	325	334	193
Control Group	340	320	197

These study groups are sufficient to detect a demonstration impact of about 10 percentage points or larger with 80 percent power (for two-tailed tests at the .10 significance level on a binary variable with mean of .50) for the AdminaStar and IFMC projects. The comparable minimum detectable response for the Providence Hospital study group is about 12 percentage points.

The second factor that reduced study group sizes was nonresponse to specific survey questions, or the inapplicability of a particular question for a particular respondent. (For example, some questions were

asked only of respondents with CHF.) Study group sizes for specific impact estimates are noted in the tables of Chapters V and VI.

B. STATISTICAL METHODS

The analyses of demonstration effects on use, cost, and quality of care required a number of different hypothesis tests, estimation procedures, and control variables. Our general approach was to estimate regression or regressionlike models, separately for each project, to determine the effect of the case management intervention.

Initial concerns about possible distortion of demonstration effects due to spillover proved to be unwarranted. If providers (physicians, nurses, home health providers) serving clients also treat beneficiaries who are in the control group, and case management leads them to make changes in their practice patterns for all of their patients, this “spillover” effect would contaminate the control group and obscure demonstration impacts. The evaluation originally included an analysis to assess the extent of spillover. This involved selecting comparison groups of Medicare beneficiaries similar to those enrolled in the demonstrations but in geographic areas external to the demonstrations. (See Brown and Schore 1994 for a description of the planned spillover analysis.) Project contact with physicians (and other providers) however, was much less than expected; staff at all projects said it was minimal. Thus, spillover effects were also certain to have been nonexistent or trivial, so the planned spillover analysis was not carried out.

1. Hypothesis Tests

For each of the outcome measures examined, we conducted formal hypothesis tests to determine whether estimated demonstration impacts are significantly different from zero. Because of the considerable difference in target populations and case management approaches, separate tests were performed for the three demonstration projects. We also tested whether impacts differed from zero for various subgroups of beneficiaries and whether impacts differed significantly across subgroups. The tests

were based on the coefficients on treatment status from the estimated models. Two-tailed tests were conducted at the .10 significance level, reflecting the possibility that case management could increase or decrease any of the cost, utilization, or quality of care outcomes.

2. Estimation Procedures

The statistical method used for a given outcome depended on the nature of the outcome variable. For binary outcome measures, such as whether admitted to a hospital, we estimated logit models to assess the project impact on the probability of occurrence. For truncated variables with zero values for many observations, such as the amount of Medicare reimbursements for home health care, we estimated Tobit models. For continuous variables, such as the amount of total Medicare reimbursements, we used ordinary least squares regression models.

a. Special Issues in Estimating Impacts on Medicare Reimbursement

Although ordinary regression models were used to obtain unbiased estimates of impacts on reimbursements for Medicare-covered services, potentially more efficient estimates were also obtained by using models that take into account the highly skewed nature of these reimbursements, which could distort impact estimates. Because the targeted beneficiaries were expected to be high-cost cases, a few beneficiaries had extremely large reimbursements. These large reimbursements have a disproportionately large effect on the (regression-adjusted or unadjusted) mean for the group to which they belong. For example, a single beneficiary with reimbursements of \$200,000 would increase the mean for a study group of 500 beneficiaries by \$400. Even if average reimbursements for the group are \$10,000 (about three times the overall mean for Medicare beneficiaries), this beneficiary would increase the mean by nearly four percent.⁶ Using the logarithm of reimbursements as the dependent variable in the regression model

⁶In fact, the 95th percentile for total Medicare reimbursement among control group members during the year following enrollment ranged from \$35,752 for AdminaStar to \$57,024 for Providence Hospital
(continued...)

reduces the influence of the extreme cases. Therefore, this method may yield results that are more representative of true demonstration effects than would otherwise be obtained from groups that, by chance, have more or larger extreme outliers in one group than in the other.

We also compared our overall estimates of impacts on Medicare reimbursements with estimates calculated by the projects themselves. The projects were required to estimate the amount of savings that they expected to generate, although there are no guidelines on how these estimates were to be calculated. According to their protocols, the three projects expected reductions of very roughly 30 percent in Medicare Part A costs as a result of case management.

b. Special Issues in Estimating Impacts on Quality

Several of the outcome variables for the quality analysis were ordinal measures (such as “excellent,” “good,” “fair,” or “poor” rankings of satisfaction). Ordinal logit models were used to estimate the ordinal variables.

c. Variation in Project Effects Over Time

Tests were also conducted to determine whether demonstration effects depended on the length of time beneficiaries were exposed to the intervention or on the length of time since the beneficiaries last left the hospital prior to enrolling. Such relationships could occur, for example, if beneficiaries in the control group were monitored fairly closely by their regular physicians or home health agencies during the first month or so after a hospital stay, but less closely afterward. The effect of case management might then be observed only after an initial interval. We estimated the variations in impacts with length of time since prior hospitalization, by adding an interaction term (weeks between hospital discharge and enrollment, by treatment status) to the models. We measured variations in impacts by length of time since enrollment by

⁶(...continued)

as compared with median reimbursement in the range of \$4,946 to \$8,605 and mean reimbursement in the range of \$10,481 to \$16,331.

defining outcome measures over different intervals (for example, hospital admissions during month 1, during months 2 to 6, or more than six months ago).

d. Estimating Impacts for Subgroups

The effects of case management on the costs, service use, or quality of care for a particular beneficiary are likely to depend on the project in which that beneficiary was enrolled and on his or her characteristics, including access to informal care or age. The potential differences in impacts across projects might result from differences in the manner in which case management was implemented, the diagnoses targeted, the types of services emphasized, or many other project or environmental features. Demonstration impacts also might differ over time, as the projects evolved. Impacts might differ across beneficiaries, because some beneficiaries are at higher risk than others of having adverse outcomes and because some beneficiaries are better able than others to identify and obtain needed services. Measuring these differences in impacts across beneficiaries is important, because estimates of the average impact over all enrollees could mask important impacts on subsets of the target population. The findings could also suggest more efficient targeting strategies than the demonstration projects were practicing.

Subgroups Defined by Project Characteristics. To capture the expected differences across projects, we estimated separate models for each of the projects. This approach yields more valid and efficient estimates, because the projects targeted different conditions and intervened in different ways, and at different points in the course of illness. (For example, AdminaStar enrolled most beneficiaries months after hospital discharge, while most beneficiaries identified by the IFMC and Providence Hospital projects were in the hospital when they were offered the opportunity to participate.) Although we compare the estimates across projects, it is difficult to attribute any differences to particular project characteristics, especially given the difference in diagnoses targeted.

Project effectiveness may well improve with experience. To assess whether such improvement did occur, we estimated models to determine whether project effectiveness depends on when in the

demonstration enrollment period the beneficiary entered the project. Thus, for the IFMC and Providence Hospital projects, impacts on that half of the enrollees entering first were compared with impacts on the half that entered later. (Similarly, we compared the two-thirds of AdminaStar beneficiaries enrolled in December 1993 with the other one-third enrolled in April 1994.)

Subgroups Defined by Beneficiary Characteristics. Beneficiary characteristics form the key subgroups we examined. These included:

- Age 85 or younger versus over 85
- Whether completed high school versus did not complete high school
- Whether married versus never married or no longer married
- Whether beneficiary lives in a rural area versus a metropolitan area
- Whether income less than \$10,000 versus \$10,000 or higher
- Whether time since last hospitalization before random assignment was one month or less, versus two to six months, versus more than six months
- Whether total Medicare reimbursement in year preceding enrollment in the top 25 percent study group, the middle 50 percent, or the bottom 25 percent

Several subgroups were examined for specific projects because staff members believed their projects may have had a differential effect on beneficiaries in those groups and because data were available to define them. For the AdminaStar project, this included whether the beneficiary had diabetes in addition to CHF and the cause of CHF (that is, whether it was ischemic, hypertensive, or idiopathic). For the IFMC project this included whether the beneficiary was in the CHF or COPD target group. (No special subgroups were examined for the Providence Hospital project because the project enrolled relatively few beneficiaries with a relatively large number of target conditions, making it impractical to subdivide the study group further.)

Methodology for Estimating Subgroup Effects. We estimated the effects for subgroups defined by beneficiary characteristics by adding interaction terms (the product of the treatment status indicator and

the variable defining the subgroups) to the regression models and estimating the augmented models. The coefficient on these interaction terms measures the difference in demonstration effects between those with the subgroup characteristic and those without it. Thus, the subgroup models yield estimates of how demonstration effects would change if the projects targeted a particular subgroup.

We tested the subgroup estimates for whether they were significantly different from zero and from one another, but we have little power in these tests to detect impacts, or differences in impacts, unless they are quite large. The study group sizes for the projects are not large, and splitting them into subsets on the basis of whether the beneficiary had a particular characteristic reduced them even further. For example, in the smallest project (Providence Hospital), we have roughly 200 clients and an equal number of controls. This number of observations provides 80 percent power to detect impacts of about 12 percentage points or larger on a binary variable with a mean of .50 (assuming simple two-tailed comparison of means tests at the .10 significance level). Differences between subgroups must be even larger to be detectable with 80 percent power. If the study group were divided into two subgroups of equal size, we can be confident of detecting only those impacts that are 17.6 percentage points or larger. Thus, we focused our attention only on subgroups that comprise a significant fraction of the study group and generally split the study group into only two subgroups (for example, subgroups defined by age 85 or younger versus those older than age 85).

3. Control Variables

A single set of independent variables was used in the models to control for preexisting differences between the clients and control group members. Those selected are person-level characteristics shown by others to be associated with the use of Medicare-covered services, plus a few variables reflecting the severity and timing of the most recent hospital stay. We included two county-level control variables based on ARF data measuring the availability of physicians (number of physicians per 100,000 residents in 1994) and nursing home beds (number of skilled nursing home beds per 100,000 residents over the age of 65 in

1991) to control for the effects of the supply of these services on utilization. To capture area-level differences in practice patterns and cost, we also included average Medicare reimbursement per enrollee in the county.

Table IV.2 lists the control variables and provides their means for the client and control groups for each project. (Statistical tests showed the client and control groups to be similar along the dimensions captured by the control variables. Appendix Tables A.2 through A.10 present additional client/control comparisons.) They were predominantly female and white. The Providence Hospital project enrolled a somewhat higher proportion of nonwhite beneficiaries than the other two projects, likely reflecting differences in the racial compositions of the projects' services areas. The typical demonstration participant was 77 years old and first became eligible for Medicare due to age (rather than permanent disability).

Total Medicare spending during the year before enrollment ranged from roughly \$11,000 for AdminaStar enrollees to \$16,000 for Providence Hospital enrollees, reflecting both differences in enrollee acuity across projects and difference in health care costs across project service areas. This is roughly between three and four times mean Medicare spending for all beneficiaries in the United States in 1994. The high levels of Medicare spending are partially the result of nearly all clients and control group members having been hospitalized during the year before random assignment. At least 80 percent of enrollees at the IFMC and Providence Hospital projects had been hospitalized within the 30 days before enrollment. Among AdminaStar enrollees, however, only 10 percent had been hospitalized that soon before enrolling.

TABLE IV.2
INDEPENDENT VARIABLE MEANS, BY PROJECT AND TREATMENT STATUS

	AdminaStar		IFMC		Providence Hospital	
	Clients	Control Group Members	Clients	Control Group Members	Clients	Control Group Members
Male (percent)	42.2	44.1	45.6	45.0	39.1	39.0
White (percent)	91.7	92.6	96.0	97.8	74.9	75.7
Age (years)	77.1	77.0	77.0	76.1	77.2	77.4
Total Medicare reimbursement during year before reference date (in tens of thousands of dollars)	11.2	12.2	15.1	15.4	16.9	15.6
Original reason for Medicare eligibility was "old age" (percent)	87.9	86.7	83.4	83.4	86.5	87.1
Was last hospitalized more than 183 days before reference date (percent)	47.9	49.2	4.3	3.0	8.7	9.0
Was last hospitalized between 31 and 183 days before reference date (percent)	43.8	42.5	11.0	14.6	7.2	5.7
Number of secondary diagnoses associated with last hospitalization before reference date	3.8	3.9	4.9	5.1	3.1	3.2
Target Diagnosis ^a						
Chronic Obstructive Pulmonary Disease	na	na	30.8	30.9	7.3	6.7
Stroke	na	na	na	na	10.1	11.4
Ischemic heart disease	na	na	na	na	16.4	16.7
Joint replacement	na	na	na	na	12.6	11.0
Community referral/pneumonia/sepsis	na	na	na	na	30.9	31.0
Other diagnoses exclusive of congestive heart failure, the omitted category	na	na	na	na	6.8	8.6
County characteristics						
Number of physicians per 10,000 residents (1994)	14.0	14.7	15.9	16.3	28.7	26.4
Number of nursing home beds per 100 elderly residents (1991)	8.1	8.1	7.2	7.3	4.0	4.1

TABLE IV.2 (continued)

	AdminaStar		IFMC		Providence Hospital	
	Clients	Control Group Members	Clients	Control Group Members	Clients	Control Group Members
Average Medicare reimbursement per enrollee (in dollars) (1991)	2,823	2,831	2,911	2,918	4,369	4,435
Number of Observations	555	555	373	362	207	210

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996; 1992 through 1995 National Claims History files; Area Resource File (February 1996).

NOTE: Statistical comparisons use Student's t-tests.

* Target diagnosis percentages presented in this table for Providence Hospital are based on diagnosis indicators used to govern survey skip logic and differ slightly from target diagnosis percentages based on the project's database presented in Tables III.3, A.10, and B.8.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

AdminaStar enrolled only beneficiaries with CHF, but among beneficiaries enrolled in the IFMC and Providence Hospital projects, only about 70 percent and 15 percent, respectively, had CHF. Nearly a third of Providence Hospital enrollees were community referrals or had been admitted to the hospital with pneumonia or sepsis; the remainder were distributed across a number of other target diagnoses.⁷

Medical service supply and spending varied across the projects' service areas. Physician and nursing home bed supply was roughly similar in the service areas for AdminaStar and IFMC. There were, however, markedly more physicians per resident, but fewer nursing home beds per elderly resident in the Providence Hospital service area. Average Medicare reimbursement for all beneficiaries in the service areas was also substantially higher for Providence Hospital than for the other two projects.

Analyses conducted on the survey study group used all of these control variables, plus a few additional variables representing beneficiary characteristics that could influence outcomes, including income, education, and marital status. These additional control variables are used in all of the analyses that rely on the survey study group.

⁷Some Providence Hospital target diagnosis control variables were dropped from models estimated using logit procedures due to lack of variation.

V. CASE MANAGEMENT EFFECTS ON SERVICE USE AND COSTS

A primary goal of the Medicare Case Management (MCM) Demonstrations was to reduce health care costs for beneficiaries who have high-cost medical conditions. Demonstration projects hypothesized that, if they identified beneficiaries likely to incur high health care costs and gave them self-care education and assistance in securing needed support services, client health would subsequently improve (or stabilize) and health care spending would decrease. Although the projects were successful in identifying clients who would have had high levels of spending in the absence of the demonstration, they were largely unsuccessful in decreasing spending.

A. HYPOTHESES AND OUTCOME MEASURES

The demonstrations expected to reduce overall Medicare costs by reducing inpatient hospital use and reimbursements. However, hypotheses about the use of and costs for other types of medical services were ambiguous. By contrast, the demonstrations expected to increase support service use. To test these hypotheses, the evaluation used regression analyses to compare beneficiaries in the client and control groups on measures of service use and reimbursement. Service use and reimbursement measures were based on Medicare claims data and the evaluation's six-month follow-up interview.

1. Expected Effects on Service Use and Costs

The demonstration projects believed reductions in unnecessary inpatient hospitalizations would be the primary mechanism for reducing overall health care spending for their clients. Hospitalization accounts for a large portion of overall health care spending. Half of all Medicare expenditures in 1993 and 70 percent of all medical spending for people with congestive heart failure (CHF) in 1990 were for inpatient hospital care. AdminaStar expected to reduce Medicare Part A costs (specifically, costs for emergent inpatient care and emergency room visits) by 30 percent (from \$9,400 to \$6,600). Similarly, the Iowa

Foundation for Medical Care (IFMC) expected to reduce the number of inpatient admissions by about 30 percent (from 2.5 to 1.8 per beneficiary per year), and Providence Hospital expected to reduce the incidence of admissions by at least 17 percent (from 35 percent annually to 29 percent or lower).

The projects expected to decrease hospital use in several ways. First, they expected to help clients better understand and adhere to their diet and drug regimens and recognize potentially serious symptoms. For example, people with CHF would be taught that swelling in the extremities, shortness of breath, and unexpected weight gain are symptoms that should be brought to their physician's attention. Second, the projects expected to improve the ability of clients to communicate effectively with their physicians (for example, to notify physicians promptly when symptoms appeared and to ask questions of physicians). The projects also expected that hospital use could be decreased if clients had better access to needed support services (personal care, housekeeping, meal preparation, transportation to medical appointments, and other services). Better self-care, more effective communication with physicians, and increased access to support services were expected to improve client health and well-being. These improvements, in turn, were expected to reduce the use of hospital services, particularly emergent care.

Hypotheses about the effects of the demonstration interventions on other medical services, however, were equivocal. Clients' improved ability to monitor symptoms, as well as the indirect monitoring by case managers, could have prompted clients to contact their physicians more frequently, possibly leading to increased use of diagnostic testing and other ambulatory care. (Although this type of increased vigilance also could increase inpatient hospital use, such increases were expected to be dwarfed by the decreases discussed earlier.) On the other hand, improved health resulting from better self-care and monitoring could lead to decreased use of physician services and ambulatory care. Similarly, increased access to support services might reduce the need for Medicare home health care or nursing home care. However, project service coordination efforts could result in increased use of Medicare home health care or nursing home

care. The demonstrations also could increase hospice use. Case managers discussed the use of hospice care with clients they believed would benefit from it and would be receptive to such discussion.

The demonstrations hypothesized that reductions in spending for inpatient hospital care would be greater than any increases in spending that resulted for other types of Medicare-covered service. Thus, the use of case management should reduce overall Medicare spending.

The demonstrations explicitly sought to increase the use of non-Medicare-covered support services for clients who needed them. Thus, we hypothesize an increase in the use of formal support services but cannot hypothesize whether case management will increase or decrease the use of such services provided informally (that is, by family members, friends, or volunteers). In addition, some support services (whether delivered formally or informally) may reduce the use of Medicare home health care (for example, by reducing the frequency of home health aide visits or observation by a nurse). Hence, we planned to assess whether any savings in Medicare spending were achieved by a shift to services paid for by other public payers or the client or to services contributed by family, friends, or volunteers.

2. Service Use and Cost Measures

Medicare claims files provided data on Medicare service use and reimbursement for each project's clients and control group members (see Table V.1).¹ Medicare services were grouped into categories. For Part A services, the categories were (1) inpatient hospital, (2) skilled nursing facility (SNF), (3) home health care, and (4) hospice. For Part B services, the categories were (1) outpatient services, and (2) physician and other Part B services. (Other Part B services include the services of Medicare-covered practitioners other than physicians, laboratory and radiology services, clinic visits, and durable medical

¹As described in greater detail in Chapter IV, clients and control group members whose Health Insurance Claim numbers could not be matched to the Medicare Health Insurance Skeleton Eligibility Write-Off file, for whom we could identify no Medicare-covered hospitalization (other than Providence Hospital community referrals), or who were deceased at the time of random assignment were excluded from the Medicare service use and cost impact analyses.

TABLE V.1

SERVICE USE AND REIMBURSEMENT IMPACT ANALYSIS OUTCOME MEASURES, BY SOURCE

Medicare Claims Data	Six-Month Follow-Up Survey
Impacts on Service Use	
Inpatient Hospital	Formal Home- and Community-Based Services
Any admission	Any personal care
Number of admissions	Any meal preparation
Number of days	Any housework or laundry
Any admission starting with emergency room visit	Any transportation to medical care
Number of admissions starting with emergency room visit	Any grocery shopping
Skilled Nursing Facility	Any routine medical treatments
Any admission	Any home-delivered meals
Number of admissions	Informal Home- and Community-Based Care
Number of days	Any personal care
Home Health	Any meal preparation
Any home health	Any housework or laundry
Number of visits	Any transportation to medical care
Hospice	Any grocery shopping
Any hospice	Any routine medical treatments
Outpatient Hospital	Nursing Home
Any outpatient use	Any stay not fully reimbursed by Medicare
Any outpatient emergency room visits	
Physician and Other Part B Services	
Any physician or other Part B use	
Impacts on Service Costs	
Inpatient Hospital Medicare Reimbursement	
Skilled Nursing Facility Medicare Reimbursement	
Home Health Medicare Reimbursement	
Hospice Reimbursement	
Outpatient Hospital Medicare Reimbursement	
Physician and Other Part B Medicare Reimbursement	
Part A Medicare Reimbursement	
Part B Medicare Reimbursement	
Total Medicare Reimbursement	

equipment.) Service use outcome measures included whether the beneficiary used the service during a given reference period and, for some services, the level of use (for example, number of inpatient admissions, number of SNF days, or number of home health visits). Hospital revenue center codes allowed us to construct indicators of whether an inpatient admission began with an emergency room visit or whether an outpatient hospital claim included services provided in the emergency room. The inpatient and outpatient indicators were then combined into a single measure of emergent service use. Reimbursement measures were constructed for each type of service, for all Part A services, for all Part B services, and for total Medicare reimbursement.

Impact estimates presented in this chapter are based on measures of Medicare service use and reimbursement during the year following random assignment. If the beneficiary was randomly assigned while in the hospital, we use the year following hospital discharge.² (We refer to this follow-up period as the first enrollment year.) We also estimated impacts on key outcomes separately for the first and second six months following the reference date, because induced changes in client behavior may take time to influence service use and costs. Conclusions regarding demonstration effectiveness based on impacts estimated during the two six-month periods generally did not differ from the conclusions presented here.³ (Appendix C, Tables C.1 to C.3 present six-month impact estimates.)

Impact estimates presented in this chapter are based on study groups that include some beneficiaries who either joined a health maintenance organization (HMO) or who died during the year. Medicare claims

²As discussed in greater detail in Chapter IV, the outcome reference date was based on this dual definition because, in practice, case management did not begin until the stay that identified a beneficiary to the project was over.

³Medicare claims data describing the first enrollment year were complete only for beneficiaries who enrolled in the demonstrations in 1993 or 1994, but not for those who enrolled in 1995 (as described in Chapter IV). This subset of beneficiaries was the basis of the impact estimates described in this chapter. We compared impact estimates for selected outcomes measured during the first six months after enrollment based on this subset with estimates based on the full Medicare claims study group. Conclusions about demonstration effectiveness did not differ from those presented in this chapter.

data for these beneficiaries will have been available for only part of the first enrollment year. As described in Chapter IV, HMO enrollment rates were low (between one and three percent) and did not differ for the client and control groups. Mortality rates during the year were higher (varying from about 16 percent for the AdminaStar and Providence Hospital projects to 28 percent for the IFMC project), but also did not differ for the client and control groups. Nevertheless, to account for any small differences in impact estimates that could occur due to small differences in available data, we also estimated impacts on Medicare reimbursement per month at risk. Reimbursement per month at risk is equal to total Medicare reimbursement during the year following the reference date divided by the total number of months the beneficiary was alive and not enrolled in an HMO.

Finally, we used data from the six-month follow-up survey to describe the use of non-Medicare-covered services during the six months following random assignment (see Table V.1). Services included formal and informal supportive care such as personal care, meal preparation, housework, transportation to medical care, grocery shopping, and routine medical treatments. Services also included nursing home care not fully reimbursed by Medicare and home-delivered meals.

B. DEMONSTRATION IMPACTS ON MEDICARE-COVERED SERVICE USE AND REIMBURSEMENT

1. Inpatient Hospital Services

Hospital admission rates among control group members of all three projects during the first enrollment year were two to three times higher than that for the average Medicare beneficiary. Forty-six percent of Providence Hospital control group members and 61 percent of IFMC control group members were hospitalized during the year, compared with just under 20 percent of all Medicare beneficiaries in 1994

(see second row of Table V.2).⁴ Thus, the projects clearly identified beneficiaries at high risk of needing hospital care.

No project, however, was successful in reducing hospital use among its clients. Given the level of serious illness among beneficiaries the projects targeted, reducing the rate of hospitalization (that is, whether clients had *any admissions*) may not have been feasible. However, the projects were also unsuccessful at reducing the number of hospital admissions or number of days their clients spent in the hospital relative to control group members. Control group members had between .9 admissions (at Providence Hospital) and 1.3 admissions (at IFMC) during the year after enrollment. Mean days spent in the hospital during the year for control groups ranged from 9 days at AdminaStar to 11 days at IFMC. Because the projects did not reduce hospital use, they also failed to reduce hospital reimbursement. Control group reimbursement levels for hospital inpatient care during the first demonstration year ranged from \$5,800 at AdminaStar to \$8,200 at Providence Hospital.

Providence Hospital clients actually had *higher* levels of inpatient hospital service use, on average, than did project control group members. For example, the likelihood of hospital admission was 20 percent higher and the mean number of hospital admissions was 35 percent higher for clients than for control group members. (These differences persisted even when our regression models controlled specifically for preenrollment hospital use.) The higher inpatient service use among clients might have resulted from case managers identifying problems that otherwise would have gone untreated (although it is unlikely that a problem serious enough to warrant a hospitalization would have gone untreated for long). Case managers also may have encouraged clients to contact their physicians more frequently, and physicians, in turn, may have had clients admitted to the hospital for tests more frequently. Since this project was run by a hospital, these outcomes may be especially likely. Alternatively, the observed differences in hospitalization

⁴See Appendix Tables C.9 and C.10 for estimated coefficients on all control variables for any admission and number of days, respectively.

TABLE V.2
ESTIMATED IMPACTS ON HOSPITAL INPATIENT USE AND
REIMBURSEMENTS AND DURING FIRST YEAR

	AdminaStar	IFMC	Providence
Whether Any Hospital Admission (Percentage)			
Impact	2.2	-1.5	10.0*
Control group mean	52.5	61.4	46.1
P-Value ^a	(.46)	(.71)	(.06)
Number of Hospital Admissions ^b			
Impact	0.03	0.03	0.31*
Control group mean	1.12	1.32	0.90
P-Value ^a	(.71)	(.83)	(.06)
Number of Hospital Days			
Impact	0.3	0.0	2.0
Control group mean	8.7	11.2	10.7
P-Value ^a	(.71)	(.98)	(.23)
Hospital Reimbursements (Dollars)			
Impact	-154	148	2,086
Control group mean	5,799	6,472	8,211
P-Value ^a	(.75)	(.83)	(.14)
Number of Observations^c	1,110	586	334

SOURCE: National Claims History files 1993 through 1995.

NOTE: Impacts on any admission are estimated using logit models; impacts on number of admissions are estimated using ordinary least squares regression models, and impacts on number of days and reimbursement are estimated using Tobit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member. See Appendix Tables C.9 and C.10 for estimated coefficients on all control variables for any admission and number of days, respectively.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

TABLE V.2 (continued)

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bThese estimates are based on ordinary least squares regressions. Ordered logistic regressions, which account for the limited number of possible values, yielded similar results.

^cThe study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, beneficiaries who died prior to random assignment, and beneficiaries randomized after 1994 (and thus, did not have complete claims data for the first demonstration year).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

may have been due to chance differences between clients and control group members that were not controlled for in our models.

2. Emergency Room Visits

The projects also hoped to reduce the use of emergency room services by reducing the incidence of emergent events (such as an acute exacerbation of CHF as a result of nonadherence to a medication regimen). Between 44 and 61 percent of control group members had at least one emergency room visit during the first enrollment year (see Table V.3).⁵ The mean number of visits during that period ranged from 1 to 1.5. (Visits included both those that resulted in an inpatient admission and those that were provided on an outpatient basis.)

As observed with inpatient hospital service use, the projects did not reduce emergency room use among clients. For AdminaStar and IFMC, estimates of client/control differences were small and statistically insignificant. Providence Hospital clients had higher levels of emergency room use than control group members; this was similar to the findings for inpatient use. Clients were a third more likely than control group members to visit the emergency room and had nearly twice as many visits. Controlling for preenrollment emergency room use did not alter this difference. Again, it is unclear whether case managers encouraged some clients to go to the hospital emergency room when they would not otherwise have done so or whether these differences had nothing to do with the intervention, but instead were chance differences between clients and control group members.

3. Skilled Nursing Facility, Home Health, and Hospice Services

The projects had no effect on the use of SNFs. Between 9 and 13 percent of control group members had an SNF admission during the first demonstration year (see Table V.4). Control group members spent

⁵See Appendix Table C.11 for estimated coefficients on all control variables for any visit.

TABLE V.3

ESTIMATED IMPACTS ON MEDICARE-COVERED EMERGENCY ROOM SERVICES
DURING FIRST YEAR

	AdminaStar	IFMC	Providence
Whether Any Emergency Room Visit (Percent)			
Impact	2.5	-1.8	17.6***
Control group mean	57.4	61.0	44.0
P-Value ^a	(.40)	(.66)	(.00)
Number of Emergency Room Visits ^b			
Impact	-0.01	-.02	.85***
Control group mean	1.37	1.45	.99
P-Value ^a	(.90)	(.88)	(.01)
Number of Observations ^c	1,110	586	334

SOURCE: National Claims History files 1993 through 1995.

NOTE: Impacts for any visit estimated using logit models and for number of visits using ordinary least squares regression models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member. See Appendix Table C.11 for estimated coefficients on all control variables for any visit.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bThese estimates are based on ordinary least squares regressions. Ordered logistic regressions, which account for the limited number of possible values, yielded similar results.

TABLE V.3 (continued)

^cThe study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, beneficiaries who died prior to random assignment, and beneficiaries randomized after 1994 (and thus, did not have complete claims data for the first demonstration year).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE V.4

ESTIMATED IMPACTS ON MEDICARE-COVERED SKILLED NURSING USE
AND REIMBURSEMENTS DURING FIRST YEAR

	AdminaStar	IFMC	Providence
Whether Any Skilled Nursing Admission (Percentage)			
Impact	-.7	1.1	3.1
Control group mean	11.2	13.1	9.1
P-Value ^a	(.67)	(.71)	(.35)
Number of Skilled Nursing Admissions^b			
Impact	-.02	.01	.05
Control group mean	.16	.19	.12
P-Value ^a	(.60)	(.79)	(.33)
Number of Skilled Nursing Days			
Impact	-.56	-.41	1.43
Control group mean	4.60	5.53	6.63
P-Value ^a	(.49)	(.75)	(.51)
Skilled Nursing Reimbursements (Dollars)			
Impact	-127	-46	174
Control group mean	818	836	614
P-Value ^a	(.35)	(.82)	(.43)
Number of Observations^c	1,110	586	334

SOURCE: National Claims History files 1993 through 1995.

NOTE: Impacts on any admission are estimated using logit models; impacts on number of admissions are estimated using ordinary least squares regression models, and impacts on number of days and reimbursement are estimated using Tobit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

TABLE V.4 (continued)

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bThese estimates are based on ordinary least squares regressions. Ordered logistic regressions, which account for the limited number of possible values, yielded similar results.

^cThe study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, beneficiaries who died prior to random assignment, and beneficiaries randomized after 1994 (and thus, did not have complete claims data for the first demonstration year).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test..

an average of between five and seven days in SNFs during the year, and mean Medicare reimbursement for them ranged from \$600 to just over \$800.⁶

The projects did not affect the use of home health services, either. Between 30 and 60 percent of control group members had home health care during the first enrollment year (see Table V.5). The mean number of home health visits for control group members ranged between 20 and 30 during the year, and mean reimbursement ranged from just over \$1,000 to \$2,700.

The AdminaStar project may have increased the use of hospice services. Just 1 control group member out of 550 (.2 percent) used hospice during the first enrollment year, compared with 6 clients (1 percent). The logit model estimate of the client/control difference in hospice use was statistically significant at the 10 percent level. The finding is consistent with information obtained from our site visits indicating that AdminaStar's case managers discussed the hospice option with clients or their families when appropriate. However, the small amount of hospice care used (especially in the control group) raises concern that the estimated effect may be a statistical anomaly. At the other two projects, roughly three percent of clients and control group members used hospice during the first enrollment year.

4. Outpatient Hospital, Physician and Other Part B Services

As we observed for inpatient and emergency room use, we find no reductions in hospital outpatient services for any of the projects, but a significant increase for clients of the Providence Hospital project. Providence Hospital clients were more likely to use outpatient hospital services during the first demonstration year than were control group members (82 percent of clients, compared with 72 percent of

⁶We used survey data to estimate demonstration impacts on non-Medicare-covered nursing home use. Between 1 and 10 percent of control group members reported receiving such care (see Appendix C, Table C.4). There was no difference in use for AdminaStar or IFMC clients, but there was an increase in nursing home use of seven percentage points among Providence Hospital clients.

TABLE V.5

ESTIMATED IMPACTS ON MEDICARE-COVERED HOME HEALTH AND
HOSPICE SERVICES DURING FIRST YEAR

	AdminaStar	IFMC	Providence
Whether Any Home Health Care Visits (Percentages)			
Impact	1.4	-2.1	1.1
Control group mean	29.4	43.5	58.2
P-Value ^a	(.59)	(.58)	(.83)
Number of Home Health Care Visits			
Impact	4.5	-3.6	.5
Control group mean	19.1	24.0	31.4
P-Value ^a	(.14)	(.27)	(.92)
Home Health Reimbursements (Dollars)			
Impact	279	-237	-58
Control group mean	1,070	1,522	2,697
P-Value	(.11)	(.27)	(.88)
Whether Any Hospice Use^b (Percentages)			
Impact	1.0*	0.4	1.3
Control group mean	.2	3.8	3.0
P-Value ^a	(.08)	(.79)	(.55)
Hospice Reimbursement^b (Dollars)			
Impact	10	40	84
Control group mean	1	302	334
P-Value ^a	(.11)	(.82)	(.67)
Number of Observations^c	1,110	586	334

SOURCE: National Claims History files 1993 through 1995.

NOTE: Impacts on any visits and any use are estimated using logit models and impacts on number of visits and reimbursement are estimated with Tobit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital

TABLE V.5 (continued)

discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bThe small number of hospice users in the sample makes the validity of these estimates questionable.

^cThe study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, beneficiaries who died prior to random assignment, and beneficiaries randomized after 1994 (and thus, did not have complete claims data for the first demonstration year).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

control group members (see Table V.6).⁷ As a result, mean Medicare reimbursement for outpatient hospital services during the year among clients was roughly a third higher than for control group members (\$1,400, compared with \$1,040). The pattern of increased use of all types of hospital services (inpatient, outpatient, and emergency room) among Providence Hospital clients leads to the speculation that, because they were hospital employees, Providence Hospital case managers may have felt more comfortable than case managers at other projects referring clients to the hospital emergency room when problems arose. In addition, client physicians (all of whom had admitting privileges at the hospital), knew that their patients were also project clients; therefore, the physicians may also have been more likely to admit these patients to the hospital or refer them for diagnostic testing as hospital outpatients. On the other hand, as already mentioned, the observed client/control differences in hospital use may be due to chance differences between the two groups for which our statistical models did not control.

The other two projects had no effect on outpatient use. Roughly 80 percent of control group members had at least one outpatient service during the first enrollment year; outpatient reimbursement averaged about \$750 during the year for both projects.

None of the demonstration projects affected the use of physician or other Part B services (such as diagnostic testing or the provision of durable medical equipment). Nearly all control group members had at least one physician visit (or other Part B service) during the first year after enrollment (not in the table); this was consistent with the projects having identified beneficiaries who were chronically ill or who had other serious medical problems. Mean reimbursement for physician and other Part B services ranged from just over \$2,000 to \$3,300. Impact estimates were small and statistically insignificant.

⁷See Appendix Table C.12 for estimated coefficients on all control variables for physician and other Part B reimbursement.

TABLE V.6

ESTIMATED IMPACTS ON HOSPITAL OUTPATIENT AND
OTHER PART B SERVICES DURING FIRST YEAR

	AdminaStar	IFMC	Providence
Whether Any Hospital Outpatient Service Use (Percentages)			
Impact	-0.4	0.3	10.1**
Control group mean	82.4	80.3	72.7
P-Value ^a	(.88)	(.92)	(.03)
Hospital Outpatient Reimbursement (Dollars)			
Impact	-90	303*	376*
Control group mean	748	738	1,040
P-Value ^a	(.22)	(.08)	(.06)
Physician and Other Part B Services Reimbursement (Dollars)			
Impact	-139	-41	340
Control group mean	2,044	2,981	3,315
P-Value ^a	(.17)	(.84)	(.27)
Number of Observations^b	1,110	586	334

SOURCE: National Claims History files 1993 through 1995.

NOTE: Impacts on any use are estimated using logit models and impacts on reimbursement are estimated with Tobit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member. See Appendix Table C.12 for estimated coefficients on all control variables for physician and other Part B reimbursement.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

TABLE V.6 (continued)

^aThe p-value for each estimate from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bThe study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, beneficiaries who died prior to random assignment, and beneficiaries randomized after 1994 (and thus, did not have complete claims data for the first demonstration year).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

5. Total Medicare Reimbursement

The projects had no effect on total Medicare expenditures during the first demonstration year (see Table V.7).⁸ Mean levels of Medicare expenditures for control group members ranged from \$10,500 for AdminaStar to \$16,200 for Providence Hospital during the year (from about two and a half to four times the \$4,000 average for all Medicare beneficiaries in 1994). Mean levels of *monthly* Medicare expenditures for control group members ranged from about \$960 for AdminaStar to \$1,460 for Providence Hospital.⁹

We did observe a statistically significant decrease of about 10 percent in Part B spending for AdminaStar (from \$2,800 for control group members to \$2,500 for clients). This difference resulted from small, statistically insignificant reductions for both outpatient and physician/other Part B services. As already noted, hypotheses about the effects of the demonstrations on ambulatory services were ambiguous. The project may have reduced the frequency of physician visits and concomitant outpatient diagnostic testing either because it improved client health to some degree or because case managers answered questions that would have led to physician visits in their absence.

We observed no statistically significant reductions in Part A or Part B Medicare spending for the IFMC and Providence Hospital projects. The increases in spending among Providence Hospital clients for inpatient and outpatient services did not lead to statistically significant increases in total Part A or total Part B spending (or in total Medicare spending), although we do observe increases that were not statistically significant.

⁸ Table V.7 contains impact estimates based on ordinary least squares (OLS) estimation, while most estimates in Tables V.2 through V.6 were based on maximum likelihood techniques. While Tobit maximum likelihood estimation is the most appropriate approach for estimating reimbursement impacts, Tobit impact estimates for Part A and Part B reimbursements would not sum to total reimbursement impacts the way OLS estimates would. Tobit estimates appear in Appendix Table C.5. Conclusions based on Tobit estimates do not differ from those presented here. See Appendix Table C.13 for estimated coefficients on all control variables for total reimbursement.

⁹ Monthly mean Medicare expenditures were based on observations weighted in proportion to the number of months each beneficiary was alive and not in an HMO (that is, at risk of incurring Medicare fee-for-service costs).

TABLE V.7
ESTIMATED IMPACTS ON MEDICARE REIMBURSEMENTS
DURING FIRST YEAR

	AdminaStar	IFMC	Providence
Total Medicare Reimbursements (Dollars)			
Impact	-585	801	2,281
Control group mean	10,481	12,851	16,212
P-Value ^a	(.48)	(.52)	(.34)
Total Part A Medicare Reimbursements (Dollars) ^b			
Impact	-265	330	1,532
Control group mean	7,689	9,131	11,857
P-Value ^a	(.72)	(.74)	(.76)
Total Part B Medicare Reimbursements (Dollars)			
Impact	-320*	471	748
Control group mean	2,792	3,719	4,355
P-Value ^a	(.09)	(.25)	(.16)
Total Medicare Reimbursements per Month Alive and Not in HMO (Dollars) ^c			
Impact	-35	-31	175
Control group mean	957	1,358	1,460
P-Value ^a	(.57)	(.79)	(.35)
Number of Observations ^d	1,110	586	334

SOURCE: National Claims History files 1993 through 1995.

NOTE: Estimates were obtained using ordinary least squares regression, to ensure that impacts on Part A and Part B services summed to total impacts. Estimates obtained from Tobit models, which account for the zero values for many sample members, produced somewhat different point estimates but the same test results and conclusions. (See Appendix Table C.5.) See Appendix Table C.13 for estimated coefficients on all control variables for total reimbursement.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment

TABLE V.7 (continued)

took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bPart A hospital outpatient services are excluded. All hospital outpatient services are Part B services.

^cObservations are weighted in proportion to the number of months alive and not in an HMO. Thus, these estimate reflect the average Medicare reimbursements **per beneficiary month at risk**.

^dThe study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, beneficiaries who died prior to random assignment, and beneficiaries randomized after 1994 (and thus, did not have complete claims data for the first demonstration year). Number of observations for reimbursements per month are AdminaStar: 1,099, IFMC: 558, and Providence 331.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

C. DEMONSTRATION IMPACTS ON THE USE OF HOME- AND COMMUNITY-BASED SERVICES

We hypothesized that case management support service coordination activities would increase the use of home- and community-based services such as personal care, meal preparation, housework, transportation, grocery shopping, or routine medical treatments (for example, checking blood pressure, helping with prescribed exercises, or setting up medications). Case manager efforts could increase the use of services provided by paid caregivers (sometimes referred to as formal services) or the use of services provided by family or friends (referred to as informal services), or both.

However, the projects did not increase either formal or informal home- and community-based service use. Levels of formal use among control group members were relatively low. Only between 32 percent of control group members for the AdminaStar project and 42 percent for the Providence Hospital project used at least one formal service during the six months after enrollment (see Table V.8). Three reasons are possible for the low rates of formal service use: (1) beneficiaries did not have high levels of functional impairment (even though they had serious medical conditions) and, thus, needed little assistance; (2) most beneficiaries who needed assistance received it from family or friends; or (3) formal services were in limited supply. We believe all three reasons contributed to the low rates of formal service use. As noted in Chapter III, most beneficiaries were able to transfer, walk indoors, bathe, and take medications independently (between 70 and 95 percent, depending on project and activity). The use of informal services was relatively high. Roughly three-quarters of each project's clients and control group members received services from informal caregivers and, thus, were less likely to require paid assistance (see Table V.8). Finally, case managers at each project noted that waiting lists were long for support services provided at no cost or at a reduced price. Thus, the supply of services was limited for clients without the resources to pay for them. Case managers may only have been able to get such clients onto waiting lists; they may not have been able to guarantee them services.

TABLE V.8

ESTIMATED IMPACTS ON THE USE OF HOME- AND COMMUNITY-BASED SERVICES
DURING FIRST SIX MONTHS

	AdminaStar		IFMC		Providence Hospital	
	Control Group Mean	Estimated Impact (P-Value) ^a	Control Group Mean	Estimated Impact (P-Value) ^a	Control Group Mean	Estimated Impact (P-Value) ^a
Formal Services						
Personal Care	6.0	-1.2 (.48)	9.3	-0.6 (.79)	16.9	-2.5 (.50)
Meal Preparation	13.4	-4.7* (.06)	18.0	-3.3 (.26)	19.8	-1.3 (.74)
Housework	12.9	-0.5 (.84)	13.0	-0.5 (.86)	19.9	1.6 (.71)
Routine Medical Treatments	1.8	-1.0 (.27)	3.8	-2.4* (.07)	3.1	2.4 (.24)
Transportation for Medical Care	12.8	2.0 (.46)	21.8	-6.2** (.05)	14.3	3.6 (.35)
Grocery Shopping	1.8	0.0 (.91)	2.2	0.0 (.98)	3.6	-0.1 (.93)
Any Formal Service Use	31.5	-1.9 (.58)	40.3	-3.3 (.38)	42.1	2.2 (.65)
Informal Services						
Personal Care	23.9	-6.0* (.06)	28.0	0.2 (.96)	28.6	2.1 (.64)
Meal Preparation	47.8	4.6 (.23)	53.7	-3.3 (.40)	55.4	6.1 (.21)
Housework	56.6	3.2 (.40)	60.4	-0.3 (.95)	59.5	6.6 (.18)
Routine Medical Treatments	36.9	-0.8 (.84)	33.3	2.4 (.52)	39.0	1.1 (.82)

TABLE V.8 (continued)

	AdminaStar		IFMC		Providence Hospital	
	Control Group Mean	Estimated Impact (P-Value) ^a	Control Group Mean	Estimated Impact (P-Value) ^a	Control Group Mean	Estimated Impact (P-Value) ^a
Transportation for Medical Care	58.2	2.1 (.57)	58.4	3.1 (.42)	67.9	0.9 (.84)
Grocery Shopping	62.7	3.4 (.36)	63.1	-0.5 (.89)	67.4	4.6 (.32)
Any Informal Service Use	73.5	3.2 (.33)	72.8	0.6 (.85)	76.6	3.1 (.45)
Number of Observations^b		661		640		385

SOURCE: Evaluation's six-month follow-up telephone survey fielded between May 1994 and November 1995.

NOTE: Impacts are estimated using logit models. The impact estimate is the difference between the expected value for all observations if they were a control group member and the expected value for all observations if they were a control group member.

*The p-value for each estimate from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^b AdminaStar's study group size ranges from 652 (Informal Grocery Shopping and Informal Personal Care) to 661 (Informal Transportation). IFMC's group size ranges from 627 (Informal Grocery Shopping) to 642 (Formal Personal Care). Providence Hospital's group size ranges from 381 (Formal Personal Care) to 385 (Informal Personal Care).

^aSignificantly different from zero at the .10 level, two-tailed test.

^{**}Significantly different from zero at the .05 level, two-tailed test.

^{***}Significantly different from zero at the .01 level, two-tailed test.

The proportion of control group members receiving formal assistance of a given type ranges from about 2 percent (for example, for routine medical treatment or grocery shopping) to 20 percent (for example, for medical care transportation or meal preparation). Only for three of the services is the estimated effect significantly different from zero. Formal help with meal preparation is significantly lower for AdminaStar clients than for control group members, and help with routine medical treatments and transportation to medical care are significantly lower for IFMC clients than for control group members. Given the inconsistency of the signs of estimated effects across different types of services, these estimates seem likely to be statistical anomalies rather than real impacts of case management.

The results for informal services also suggest no effects of case management on any of the services examined. Only the estimate for assistance with personal care for the AdminaStar project is statistically significant. The estimate shows that AdminaStar clients are less likely than control group members to receive informal assistance with personal care tasks.

While the significantly lower use of some scattered formal and informal services could be due to demonstration effects, this seems unlikely. First, the expectation was that such services would increase, rather than decrease. Second, although increased independence of clients could reduce the need for formal and informal assistance, we have no evidence that the project had such an effect on clients. Our estimates in Chapter VI show no effect on client functioning. Thus, we believe these estimated differences to be due to chance.

D. DEMONSTRATION IMPACTS ON CLIENT SUBGROUPS

Although the projects were unsuccessful in reducing hospital use and total Medicare reimbursements or increasing the amount of home- and community-based services received, the projects may have affected the service use and spending for particular subgroups of clients. If the projects were more successful for certain types of beneficiaries than others, information about which types of beneficiaries benefited more may help to refine targeting criteria for future case management interventions.

Project staff members suggested a number of types of clients they believed had benefited the most from their intervention, as discussed in Chapter II. These included:

- Clients who were younger than age 85, because younger clients were more amenable to making the lifestyle changes case managers and physicians recommended
- Clients who were more educated, because they seemed to assimilate self-care education more easily
- Clients without informal caregivers (such as spouses) to provide needed assistance, clients with limited financial resources, and clients who lived in rural areas in which formal support services were more difficult to obtain, because these groups seemed to benefit more from the service coordination efforts of case management¹⁰
- Clients who had been hospitalized recently, but not immediately preceding enrollment, because the memory of the hospitalization furnished an incentive to make lifestyle changes, and the client would usually be sufficiently recovered from the hospitalization to focus on self-care

The subgroups we examined were defined by these characteristics, plus a few that were specific to individual projects (for example, CHF etiology for AdminaStar, target diagnosis for IFMC and Providence Hospital, client depression for Providence Hospital).¹¹

For the IFMC and Providence Hospital projects, we found subgroup impact estimates to be generally similar to overall impact estimates. We estimated impacts for a few key Medicare outcomes measured over the first six months after enrollment for subgroup analysis: the likelihood of hospital admission, the likelihood of an emergency room visit, reimbursement for physician and other Part B services, and total

¹⁰Urban areas were defined as Standard Metropolitan Statistical Areas (SMSAs) or nonmetropolitan counties adjacent to SMSAs with populations of 20,000 or more. Rural areas were defined as all other counties. The Providence Hospital project did not include beneficiaries who lived in rural areas. Thus, rural/urban subgroups were not used in their subgroup analysis.

¹¹Statistically significant subgroup impacts are summarized in Tables V.9 and V.10. Numerical impact estimates appear in Appendix C, Tables C.6 through C.8.

TABLE V.9

SUMMARY OF ESTIMATED SUBGROUP IMPACTS ON MEDICARE SERVICE USE AND REIMBURSEMENT DURING FIRST SIX MONTHS, PROVIDENCE HOSPITAL

	Any Inpatient Hospital Admission (%)	Any Emergency Room Use (%)	Physician and Other Part B Reimbursement (\$)	Total Medicare Reimbursement (\$)
Overall Impact	10.0*	17.6***	340	2,280
Age				
85 or younger	+	***	+	+
Over 85	+	***	+	+
Education				
High school graduate	-	+	***	-
Not a high school graduate	+	***	+	+
Marital status				
Married	***	***	+	+
Not married	-	-	-*	-
Income				
Below \$10,000	0	0	-*	-
Above \$10,000	+	***	+	+
Medicare reimbursement year before enrollment				
Top quartile	+	***	-	-
Middle two quartiles	+	***	+	+
Bottom quartile	+	0	-	+
Months since last pre-enrollment hospitalization				
Within last month	+	-	+	+
Between 1 and 6 months ago	+	***	+	+
More than 6 months ago	+	+	+	+
Depressed or Low Morale				
Depressed or has low morale	+	+	+	+
Not depressed and does not have low morale	+	+	+	+
Target Diagnosis				
CHF, COPD, or major joint replacement	+	+	-	+
Other diagnosis	+	***	+	+
Number of Observations*	417	417	417	417

TABLE V.9 (continued)

SOURCE: National Claims History files 1993 through 1995; evaluation six-month follow-up survey; Geriatric Case Management database.

NOTE: See Appendix Table C.8 for numerical impact estimates.

* Study group varies for education (382); marital status (387); income (323); depressed (327), and target diagnosis (416).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

- means the treatment/control difference was negative.
- + means the treatment/control difference was positive.

TABLE V.10

SUMMARY OF ESTIMATED SUBGROUP IMPACTS ON MEDICARE SERVICE USE
AND REIMBURSEMENT DURING FIRST SIX MONTHS, ADMINASTAR

	Any Inpatient Hospital Admission (%)	Any Emergency Room Use (%)	Physician and Other Part B Reimbursement (\$)	Total Medicare Reimbursement (\$)
Overall Impact	2.2	2.5	-139	-585
Age (over/ under 85)				
Education (high school graduate/ nongraduate)				
Marital status (married/ not married)				
Urban/ rural residence				
Income (above/ below \$10,000)				
Medicare reimbursement year before enrollment				
Top quartile	+	+ *	+	+
Middle two quartiles	+	-	-	-
Bottom quartile	+	-	- **	-
Months since preenrollment hospitalization (last month/ 1 to 6 months ago/ more than 6 months ago)				
Diabetes as comorbid condition (yes/ no)				
CHF Etiology				
Ischemic	-	-	-	-
Hypertensive	-	- **	-	-
Idiopathic	+ **	+	+ **	+ **
Other	-	+ *	-	-
Number of Observations*	1,110	1,110	1,110	1,110

TABLE V.10 (continued)

SOURCE: National Claims History files 1993 through 1995; evaluation six-month follow-up survey; Patients Assisted to Healthy Hearts project database.

NOTE: See Appendix Table C.6 for impact estimates.

*Study group sizes differ for education (658); marital status (664); income (597); diabetic (1,106), and CHF etiology (1,106).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

- means the treatment/control difference was negative.

+ means the treatment/control difference was positive.

Medicare reimbursement.¹² We found no differences in estimates of the effectiveness of the IFMC project across any of the subgroups examined. We found a few isolated differences in estimates of the effectiveness of the Providence Hospital project, but no overall patterns that would suggest case management helped some clients more than others (see Table V.9). These differences suggested that the project may have increased service use and reimbursements for clients who had not graduated from high school and for clients who were married more than it did for high school graduates or those who were not married. However, we are unaware of any reason why this should have occurred and speculate that any statistically significant differences were artifacts of the project's small study group size.

We did observe a difference in effectiveness for subgroups of AdminaStar clients defined by their CHF etiology (see Table V.10). Etiology included the following underlying causes of CHF: ischemic (resulting from damage to the heart caused by a heart attack), hypertensive (resulting from high blood pressure), other causes (such as faulty heart valves or the long-term effects of diabetes or alcoholism), and idiopathic (underlying cause unknown). We found that clients with idiopathic CHF had significantly higher rates of inpatient hospital use and higher levels of physician/other Part B and total reimbursement than control group members with idiopathic CHF. Offsetting these increases was a pattern of reduction for clients with ischemic and hypertensive CHF; however, only one of these reductions was statistically significant. Case managers may have been more successful in improving the health of and reducing service use and costs for clients with regimens expressly meant to treat the underlying cause of CHF (for example, for hypertensive CHF, taking medications to reduce blood pressure). On the other hand, we have no explanation for the increase in service use and costs for the idiopathic cases. Thus, the differences may be due to chance rather than to the intervention.

¹²The 6-month analyses study group was used for subgroup analysis because the 12-month study group was too small, particularly for Providence Hospital.

We also selected a small number of key home- and community-based service use measures for subgroup analysis: personal care, meal preparation, and transportation. We found no differences across client subgroups in project impacts for any of these outcomes.

E. CONCLUSIONS

The MCM Demonstrations did not reduce the overall use or cost of Medicare-covered services and had no effect on the use of home- and community-based support services. The AdminaStar demonstration may have reduced the use and costs of some types of Medicare-covered services for clients whose CHF was ischemic or hypertensive in etiology, but the demonstration did not appear to be effective for any other subgroups of clients. In one project (Providence Hospital), case management actually may have increased costs.

VI. CASE MANAGEMENT EFFECTS ON CARE QUALITY OUTCOMES

The Medicare Case Management (MCM) Demonstrations sought to identify beneficiaries likely to incur catastrophic health care costs and to reduce those costs primarily by improving overall care quality through better self-care education and support service coordination. These improvements were expected to make clients' health better, to reduce unmet service needs, and, ultimately, to reduce health care spending. The projects did identify groups of beneficiaries who would have had unusually high health care costs in the absence of the demonstration, but, in general, failed to reduce their health care spending. This failure can be associated with the projects' inability to substantially improve client self-care or health or to increase clients' use of support services.

In this chapter, we find several instances of statistically significant estimates of client-control group differences that we believe are not attributable to demonstration impacts. In many cases, the differences are not in the hypothesized direction (for example, suggesting less frequent practice of self-care by clients than controls). In most cases, we can identify no plausible rationale for or mechanism by which the projects could have had such an impact. These significant differences tend to be isolated rather than part of a consistent pattern across related outcome measures, as one would expect to see if the projects actually had caused the difference between the groups. Many are significant at only the .10 level. Moreover, we feel that it is important to be equally skeptical of statistically significant differences with similar characteristics, but in the expected direction. Thus, we interpret statistically significant regression-adjusted estimates of client-control differences as clear evidence of project impacts only if they are sizable, statistically significant at the .05 or .01 levels, and part of a consistent pattern with other outcome measures. While we also used this method of interpreting client/control group differences in Chapter V, the frequency of isolated significant differences in this chapter leads us to emphasize our approach here.

A. HYPOTHESES AND OUTCOME MEASURES

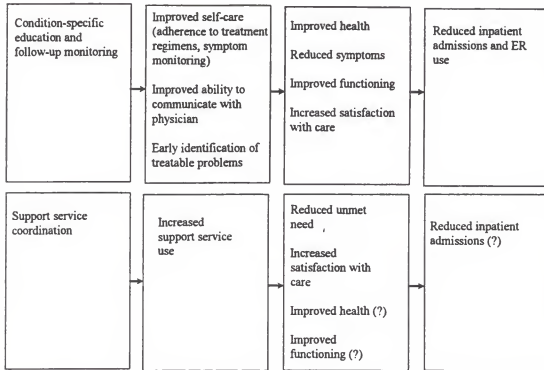
The quality of health care delivered by an organization is traditionally measured in terms of its *structural capacity* to provide care of adequate quality, the *processes* it employs to ensure good care, and the care-related *outcomes* of its patients or clients. Chapter III described the structures and processes through which the case management demonstrations may have been expected to effect care quality: staff qualifications and training, caseload sizes, quality assurance procedures, and case management activities. In this chapter, we examine the effect of the demonstrations on beneficiary-level quality-related outcomes: condition-specific self-care and symptoms, health status, functioning, and satisfaction with care.

1. Expected Effects on Quality Outcomes

The case management projects were expected to improve clients' self-care, health, and functioning primarily through condition-specific education (see Figure VI.1). Many of the beneficiaries the projects targeted had chronic illnesses, such as congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD). As noted in Chapter I, to maximize functional capability, individuals with chronic illness often must adhere to complex medication, diet, and exercise regimens. They also must control condition-related symptoms to the extent possible and adapt everyday activities. A thorough understanding of their medical condition and the reasons behind complex treatment regimens provides individuals with chronic illness the information and empowerment needed to carry out effective self-care (Lorig 1993; and Mockenhaupt 1993). Projects educated clients about their illnesses, appropriate self-care activities, and potentially important symptoms that indicated a need to contact physicians. Projects also assisted clients in improving their ability to ask questions of their physicians and encouraged clients to call their physicians to ask questions and report symptom changes. These improvements in self-care were expected to reduce condition-related symptoms and improve health and functioning. Improved health would then lead to a reduction in the number and severity of acute medical problems and the cost of their treatment.

FIGURE VI.1

HOW CASE MANAGEMENT MAY AFFECT QUALITY OF CARE
AND CLIENT OUTCOMES



The projects also expected that coordination of support services such as personal care, home-delivered meals, and transportation to medical care would improve overall care quality. Service coordination may be expected to reduce clients' unmet service needs and increase satisfaction with care provision. However, the vast literature evaluating the provision of support services for frail elderly individuals contains little evidence that such services directly improve health and, thus, reduce hospitalization and health care spending overall. Evidence is also mixed about whether the provision of support services increases or reduces an individual's ability to independently engage in activities of daily living. For example, the evaluation of the National Long-Term Care Channeling Demonstration found a reduction in levels of independent functioning among some clients (Applebaum et al. 1988).

Project service coordination efforts also included assisting clients in gaining access to pharmaceutical companies' indigent care programs or making arrangements with local pharmacies about payment or delivery. Many clients had medication regimens that included numerous prescriptions, and some clients had difficulty regularly purchasing all of them. For projects to improve health through this mechanism, however, case managers would have to succeed in seeing that clients got all of the medication they needed on a regular basis and in getting clients to adhere to medication administration schedules.

2. Measures of Quality Outcomes

The evaluation had measures of the following beneficiary-level quality outcomes: performance of condition-related self-care, occurrence of condition-related symptoms, indicators of health and functional status, and indicators of satisfaction with service arranging and care (see Table VI.1). Most measures of these outcomes were based on responses to the evaluation's six-month follow-up survey.¹ The survey contained batteries of questions about self-care activities and symptom monitoring specific to the diagnoses the three projects targeted. These questions asked about recent adherence to key self-care activities and

¹Survey questions describing self-care, symptoms, and functioning were not asked of proxy respondents for beneficiaries who were deceased or comatose at the time of the interview.

TABLE VI.1
QUALITY IMPACT ANALYSIS OUTCOME MEASURES, BY SOURCE

Six-Month Follow-Up Survey	Medicaid Claims Data
Self-Care Activities for Congestive Heart Failure (CHF)*	Health Status Proxies
Adherence to drug regimen	Any inpatient admission
Regular blood pressure monitoring	Number of inpatient admissions
Regular weight monitoring	Number of secondary diagnoses for first inpatient admission
Has list of CHF/chronic obstructive pulmonary disease problems to monitor	Length of first inpatient admission
CHF Symptoms to Monitor*	Whether died during first inpatient admission
Shortness of breath	
Swelling in feet or ankles	Mortality
Sudden substantial weight gain	
Health	
Overall health assessment	
Days spent in bed	
Functional Limitations	
Transfer from bed to chair	
Walking indoors	
Bathing	
Taking medications	
Satisfaction with Service Arranging	
Transportation to medical care	
Filling prescriptions	
Personal care and help around house and community	
Unmet need for personal care or help around house or community	
Satisfaction with Care	
Ability to obtain information about condition, tests, and treatments	
Adequacy of prevention advice	
Satisfaction with overall care quality	

* Survey asked about self-care activities and symptoms for each target diagnosis. See Table IV.4 and text for descriptions of activities and symptoms for conditions other than CHF.

the incidence of important condition-specific symptoms during the month before interview. For example, beneficiaries with CHF were asked how many times they had missed their heart medications during the week before the interview and the last time they were weighed or had blood pressure measured, as well as whether they experienced shortness of breath, swelling in extremities, or a weight gain of two or three pounds in a couple of days.² Providence Hospital enrollees with nutritional and metabolic conditions received a different battery of questions, depending on whether they had diabetes, pressure sores, or dehydration/electrolyte imbalance. No self-care and symptom questions were developed for Providence Hospital beneficiaries in the pneumonia/sepsis target group, because these infections generally are considered short-term and no special self-care activities are associated with them. Questions were not developed for the community referral target group, because beneficiaries in this group were identified by their general frailty rather than by specific medical conditions.

The survey included questions about the ability of beneficiaries to transfer from a bed or chair, walk indoors, bathe, and organize and take medications independently. To distinguish between ability to perform and actual performance of activities, beneficiaries were asked whether they performed these activities independently during the two weeks before interview and, if they did not, whether they could have if no one had been available to assist them. It is important to include both types of measures. Individuals sometimes will let others assist them with activities if help is available, even if they could perform the activities independently if left alone. On the other hand, when individuals are asked if they are able to perform an activity, they may overestimate their ability (Applebaum et al. 1988).

²Some self-care questions were asked only of respondents who might reasonably be expected to perform the care. For example, respondents with CHF who were not taking heart medications were not asked whether they missed a dose of medicine; respondents with COPD who were not shown breathing exercises were not asked how often they performed such exercises. We restricted client/control self-care comparisons to respondents reasonably expected to perform each type of self-care. Such comparisons would be biased if the percentages of clients and control group members expected to perform the care differed. In fact, these percentages did not differ. Thus, comparisons of self-care restricted to those expected to perform self-care were not biased.

The survey included several sets of questions about satisfaction with service arranging and care. Beneficiaries were asked to assess their access to the following support services: transportation to medical care, assistance filling prescriptions, and other services (such as medical care, homemaker services, or home-delivered meals). The survey asked whether respondents felt they needed more help than they were getting with personal care or things around the house or community during the six months before the interview. Respondents were also asked to assess the ease with which they could obtain answers to questions about their medical conditions, procedures, or tests and to rate health promotion advice and overall quality of care.

Both the survey and Medicare claims provided the basis for health indicators. Survey questions asked respondents to rate overall health and report the number of days they were bed bound during the two weeks before the survey. Medicare claims data provided service-based proxy measures of beneficiary health and severity of illness. These measures included whether, during the first and second six months after enrollment, the beneficiary had an inpatient hospitalization and the number of admissions overall. (The first six-month period lines up with the period covered by the follow-up survey. We estimated impacts over the second six-month period to detect demonstration effects that may only have occurred after clients had been receiving case management for a while.) Claims data were also used to construct severity indicators for the beneficiary's first hospitalization during the year after enrollment: number of secondary diagnoses, length of stay, and whether the beneficiary died during the stay.³ Although the demonstrations were not expected to have an observable impact on mortality, we constructed a mortality indicator for the first 6 and 12 months after enrollment using dates of death maintained on Medicare eligibility files.

³Beneficiaries who did not have a hospitalization during that year were excluded from these comparisons. Differential rates of hospitalization would bias these impact estimates.

B. DEMONSTRATION IMPACTS ON CONDITION-SPECIFIC SELF-CARE AND SYMPTOMS

1. Congestive Heart Failure

CHF occurs when the heart fails to pump blood effectively throughout the body. Ineffective pumping may begin in either the left or right heart chamber, although both chambers are often affected as one chamber attempts to compensate for the other. Symptoms of right-chamber weakness stem from blood backing up in the veins and include fatigue and swelling in the liver, ankles, or legs. Symptoms of left-chamber weakness stem from blood backing up in the lungs and include shortness of breath during the day or when trying to sleep, as well as a dry hacking cough. Left-chamber weakness also leads to reduced blood flow to the kidneys, which causes them to retain salt and water; this then leads to a sudden weight gain. The goal of CHF treatment is to maintain adequate blood flow and reduce the backup of blood in the extremities, lungs, and other organs. Thus, treatment usually includes medications that increase the pumping action of the heart, relax blood vessels so that blood can be pumped more easily, and eliminate excess fluids to decrease the volume of blood that needs to be pumped (Larson 1990).

Both AdminaStar and IFMC targeted beneficiaries with CHF. Providence Hospital included CHF among its eight target conditions. However, as a result of its low overall enrollment, only a relatively small number of beneficiaries enrolled in the Providence Hospital project had CHF or any other single diagnosis. Thus, we pooled condition-specific measures of self-care for the Providence Hospital project into a single index, as described below in Section 3. (We also constructed a single index for condition-specific symptoms.)

The AdminaStar project increased weight monitoring among clients substantially: 65 percent of clients reported having weighed themselves during the two days before interview, compared with just 27 percent of control group members, an increase of over 140 percent (see Table VI.2). The increase in weight monitoring is likely due to the project's focused educational effort. To complement its educational effort, the project provided clients with lists of CHF symptoms to monitor (including sudden weight gain). A

TABLE VI.2

ESTIMATED IMPACTS ON CHF SELF-CARE AND SYMPTOMS:
ADMINASTAR AND IFMC
(Percentages)

	AdminaStar		IFMC	
	Control Group Mean	Estimated Impact (P-Value)*	Control Group Mean	Estimated Impact (P-Value)*
Self-Care				
Taking Chronic Heart Failure Medication	98.1	1.2 (.20)	99.5	-2.7* (.09)
Took All Medication Doses During the Last Week (for Those on Medications)	85.7	-.1 (.97)	88.3	0.0 (.98)
Weighed in Last Day or Two	26.8	37.9*** (.00)	43.1	7.3 (.16)
Took Blood Pressure Within Last Week	52.1	0.0 (.99)	60.7	3.0 (.56)
Had Symptom List to Prompt Physician Contact	39.3	25.5*** (.00)	49.7	-4.7 (.36)
Symptoms				
Shortness of Breath Within Last Month				
None	37.1	6.1 (.12)	47.2	4.6 (.39)
More than twice per day	29.0	-7.7** (.03)	21.0	-1.4 (.74)
No Swelling in Feet or Ankles Last Month	53.3	3.5 (.38)	56.0	6.4 (.21)
No Weight Gain of Two to Three Pounds in a Couple of Days During Last Month	82.6	-10.7*** (.00)	79.7	7.3* (.07)
Number of Observations^b	618		369	

SOURCE: Evaluation's six-month follow-up telephone survey fielded between May 1994 and November 1995.

TABLE VI.2 (continued)

NOTE: Impacts are estimated using logit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bAdminaStar study group size ranges from 601 (Weight Gain) to 618 (Taking CHF medications; Took Blood Pressure); IFMC study group size ranges from 353 (List to Monitor) to 369 (Taking CHF Medications).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

substantially greater proportion of clients (65 percent) reported having such lists than did control group members (39 percent). The improvement in weight monitoring was also likely due, in part, to the project social worker securing scales at no cost for clients who could not afford them. However, substantially fewer clients (72 percent) reported achieving adequate weight control (that is, a lack of significant weight gain over a one- or two-day period) than did control group members (83 percent). This difference is probably an artifact of clients being more likely to weigh themselves regularly. (In fact, AdminaStar clients and control group members who reported weighing themselves regularly were nearly twice as likely as those who did not weigh themselves to report weight increases.)

The project also somewhat improved the control of shortness of breath during the month before the interview. Twenty-one percent of clients reported having shortness of breath more than twice a day, compared with 29 percent of control group members. (Clients were also more likely than control group members to report no shortness of breath, but this difference was not statistically significant.) Again, this improvement is likely due to the project's focused educational intervention, supported by its provision to clients of lists of CHF symptoms to monitor.

AdminaStar had no effect, however, on medication adherence, taking blood pressure, or controlling swelling in the extremities. Almost all control group members (and clients) were taking CHF medications, and over 85 percent of control group members reported complete adherence, leaving little room for improvement by project case managers. (Complete adherence to a CHF medication regimen is necessary for treatment to be effective.) Roughly half of all control group members (and clients) had taken their blood pressure within the last week. Just over half of all control group members (and clients) reported control of swelling.

IFMC had no effect on self-care among its clients with CHF. As observed for AdminaStar, almost all clients and control group members took CHF medications, and adherence to medication regimens among control group members was already high. Just under 90 percent of control group members taking

CHF medications reported complete adherence to their medication regimens during the week before the survey. Adherence to weight monitoring and taking blood pressure was somewhat higher among the IFMC control group with CHF than it was among the AdminaStar control group (perhaps because their hospital discharges were much more recent, on average). Forty-three percent of the IFMC CHF control group reported weighing themselves in the day or two before the survey, and 61 percent reported taking their blood pressure. The IFMC project did not appear to increase the likelihood that clients would have lists to help them monitor CHF symptoms. Only about half of clients and control group members with CHF reported having such lists. In fact, the project did not start supplying symptom lists to clients until the second year of the demonstration. In any case, half of the control group apparently received such lists elsewhere.

The IFMC project may have had increased weight control among its clients with CHF. Eighty-seven percent of clients, compared with 80 percent of control group members, reported adequate weight control during the month before the survey. (However, this difference was statistically significant only at the 10 percent level.) Because the project had no significant effect on self-care, it is difficult to see how the project would have caused the observed improvement, suggesting the difference may have been due to chance. Moreover, IFMC appeared to have had no effect on controlling shortness of breath or swelling in extremities. Just under half of control group members (and clients) with CHF reported no shortness of breath, and 56 percent reported no swelling in their feet or ankles.

2. Chronic Obstructive Pulmonary Disease

COPD limits the exchange of oxygen and carbon dioxide gases in the body; thus, people with COPD have difficulty getting enough oxygen into their bloodstreams. The treatment goal for COPD is to improve the body's gas exchange system. Treatment usually includes special breathing techniques, medications, and prevention of respiratory infections. Improved breathing and controlled coughing work to open pulmonary airways. Medications are administered that dilate airways and prevent bronchial swelling.

Smoking cessation and obtaining annual influenza shots decrease the likelihood of respiratory infections (Larson 1990).

IFMC did not improve self-care among clients with COPD. The survey included COPD self-care questions regarding the practice of breathing exercises and postural drainage (that is, positioning the body to help drain phlegm), taking prescribed aerosol medications, smoking, and obtaining influenza shots. Among control group members who were shown breathing exercises or postural drainage techniques, 81 percent regularly practiced breathing exercises, but only 49 percent regularly practiced postural drainage. (see Table VI.3.) Among control group members taking aerosol medications, 96 percent took all (or almost all) prescribed doses during the week before the survey. (Unlike with CHF medication, one or two doses of aerosolized COPD medication could be missed, and the treatment would still be effective.) Nearly 90 percent of control group members with COPD reported not smoking in the week before the survey; over 80 percent had obtained flu shots. Thus, self-care adherence (other than for practicing postural drainage) was already high in the absence of the demonstration.

The project also failed to improve symptom control. While this result is not unexpected, given the lack of effect on self-care, the potential for reductions was high because the incidence of COPD-related symptoms was very high. Over 80 percent of control members with COPD reported some shortness of breath during the month before the survey, and 60 percent reported having had at least one respiratory infection that required treatment with antibiotics during the six months before the survey.

Our estimates for IFMC's enrollees with COPD show less adherence to breathing exercises for clients than for control group members. Practice of breathing exercises was 16 percentage points lower for clients than control group members. Because it is difficult to imagine how the project might have reduced adherence, we attribute this client/control group difference to chance.

TABLE VI.3
ESTIMATED IMPACTS ON COPD SELF-CARE AND SYMPTOMS, IFMC
(Percentages)

	Control Group Mean	Estimated Impact (P-value) ^a
Self-Care		
Shown Breathing Exercises	80.0	-7.4 (.24)
Did Breathing Exercises Every Day or Almost Every Day Last Week, Among Those Shown	81.4	-15.8** (.04)
Had Postural Drainage or Controlled Coughing Explained	41.7	-0.4 (.96)
Did Postural Drainage or Controlled Coughing Every Day or Almost Every Day Last Week, Among Those for Whom Explained	48.5	-6.4 (.59)
Takes Prescription Aerosol Medication	87.9	-4.7 (.36)
Took All Doses or Just Missed One or Two Doses Last Week, Among Those for Whom Prescribed	96.1	-1.0 (.74)
Did Not Smoke During Last Month	89.0	-2.3 (.62)
Had a Flu Shot Within the Last Year	82.2	-3.7 (.54)
Had Symptom List to Prompt Physician Contact	41.2	5.3 (.47)
Symptoms		
Shortness of Breath During the Last Month		
None	17.4	-0.8 (.88)
More than twice per day	47.7	11.2 (.14)

TABLE VI.3 (continued)

	Control Group Mean	Estimated Impact (P-value) ^a
Respiratory Infection That Required Prescription Antibiotic in Last Six Months		
None	39.5	1.9 (.80)
Three or more	20.9	-6.6 (.26)
Number of Observations^b		189

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

NOTE: Impacts are estimated using logit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bStudy group size ranged from 71 (Practiced Postural Drainage, Controlled Coughing) to 189 (Took Aerosol Medications).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

3. All Providence Hospital Target Conditions

The Providence Hospital project served 221 clients classified into eight diagnostic categories, each associated with a separate set of self-care behaviors and symptoms: (1) CHF, (2) COPD, (3) ischemic heart disease, (4) stroke, (5) joint replacement, (6) diabetes, (7) pressure sores, and (8) dehydration and other nutritional disorders. (The last three categories were part of the project's nutritional/metabolic disorder target group.) Ischemic heart disease was the largest group, with 50 clients. The other groups contained 32 clients or fewer. Thus, condition-by-condition analysis of project impacts on self-care and symptoms was not informative. To address the question of whether the project improved self-care, we developed an index that, for each beneficiary, divides the number of self-care activities practiced by the number of activities that reasonably could have been practiced for that condition. Similarly, to address the question of whether the project improved condition-related symptom control, we developed an index that, for each beneficiary, divides the number of condition-specific symptom improvements by the number of symptoms about which the survey asked. (Details of index construction appear in Table VI.4.) For comparison, we also constructed the indexes for the AdminaStar and IFMC projects.

The Providence Hospital project failed to improve self-care or increase symptom control for its clients (see Table VI.5).⁴ This may be due, in part, to the high percentages of control group members who already practiced self-care activities (71 percent) and had adequate levels of symptom control (72 percent) for their respective conditions. These percentages were substantially higher than those for AdminaStar control group members whose overall rates of self-care practice and symptom control were 54 and 57 percent, respectively. The AdminaStar client improvement in overall self-care reflects the already noted increase in weight monitoring. However, in the symptom control index, the decrease in weight control offset the improvement in control over shortness of breath. IFMC control group members had overall rates of self-

⁴See Appendix Tables D.4 and D.5 for estimated coefficients on all control variables for the self-care and symptom control indexes, respectively.

TABLE VI.4
COMPONENTS OF SELF-CARE AND SYMPTOM INDEXES

Type of Disease	Activities Examined in Self-Care Index	Events Examined in Symptoms Index
Congestive Heart Failure	Took all doses of medications prescribed in prior week, if on medication	No weight gain of two to three pounds in a couple of days in prior month
	Weighed within last day or two	No swelling in feet or ankles in prior month
	Took blood pressure within last week	No shortness of breath in prior month
Chronic Obstructive Pulmonary Disease	Did breathing exercises every day, if shown exercises	No shortness of breath in prior month
	Did postural drainage or controlled coughing every day, if shown drainage or coughing	No infections requiring a prescription antibiotic in prior six months
	Took all doses of aerosol medications prescribed in prior week or only missed one or two, if on medication	
	Did not smoke in prior month	
Stroke	Had blood sample drawn in last month, if on blood thinning medication	Did not fall in prior month
		Did not develop pneumonia in prior month
		Did not develop new contractures in prior month
		Did not develop new bedsores in prior month
		Did not have an occurrence of urinary incontinence in prior month
		Did not develop a problem with muscles causing stiff and awkward movements

TABLE VI.4 (continued)

Type of Disease	Activities Examined in Self-Care Index	Events Examined in Symptoms Index
Heart Attack	Doctor is satisfied with progress in weight loss	No chest pressure or pain not relieved within 15 minutes by medications in prior month
	Did not smoke in the prior month	No shortness of breath in prior month
	Followed therapeutic diet at least three or four days in prior week	No fainting spells in prior month
		No slow or rapid heartbeats in prior month
		No swelling of feet or ankles in prior month
Diabetes	Blood sugar was checked in prior three months if not on insulin; in prior month if on insulin	No incidents of hypoglycemia in prior month
	Took all doses of insulin in prior month, if on insulin	No incidents of hyperglycemia in prior month
Skin Ulcers	Has a special pad or mattress to distribute body weight evenly and help prevent sores	No new sores or no sores that worsened in the prior month
Nutritional or Miscellaneous Metabolic Disorders	Tracked fluid intake and excretion in prior day or two	No dry, swollen tongue in prior month
		Did not feel weak or exhausted in prior month
		No confusion in prior month
		No small amounts of urine for an entire day in prior month

TABLE VI.5
ESTIMATED IMPACTS ON SELF-CARE AND SYMPTOM
CONTROL INDEXES

	Control Group Mean	Estimated Impact (P-Value)*	Number of Observations
Providence Hospital			
Percent of self-care activities carried out	71.2	1.0 (.83)	159
Percent of symptoms controlled	71.7	1.5 (.71)	215
AdminaStar			
Percent of self-care activities carried out	54.3	12.8*** (.00)	618
Percent of symptoms controlled	57.4	0.1 (.97)	595
IFMC			
Percent of self-care activities carried out	69.0	-.4 (.86)	552
Percent of symptoms controlled	50.6	5.1* (.07)	523

SOURCE: Evaluation's six-month follow-up telephone survey fielded between May 1994 and November 1995.

NOTE: Impacts are estimated using ordinary least squares regression models. Dependent variables are percent of relevant self-care activities that sample members carried out or relevant symptoms controlled. See Appendix Tables D.4 and D.5 for estimated coefficients on all control variables for the self-care and symptom control indexes, respectively.

*The p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

care practice and symptom control of 69 and 51 percent, respectively. (The IFMC client improvement in symptom control reflects the weight control improvement observed for clients with CHF.)

There is little evidence that case management, as implemented by the demonstration projects, generally improved self-care or symptom control for its clients. The possible exception is that the AdminaStar intervention almost certainly improved weight monitoring and may have increased control of shortness of breath. We believe that this improved weight monitoring may have increased observation of weight control problems.

C. DEMONSTRATION IMPACTS ON HEALTH AND FUNCTIONING

1. Health Status

None of the projects improved clients' health, but the client/control differences in health for Providence Hospital were quite different from those for the other two projects. Considering first the AdminaStar and IFMC projects, clients and control group members within each project had similar levels of hospitalization during both the first and second six months after enrollment (see Table VI.6). Thirty-eight percent of the AdminaStar control group had at least one hospital admission during the first six months, and 30 percent had at least one admission during the second six months.⁵ The admission rate during the first six months for the IFMC control group (48 percent) was somewhat higher than for AdminaStar. Mean numbers of admissions were also similar for clients and control group members within each project, as were severity of illness indicators based on the beneficiary's first postenrollment hospitalization: number of secondary diagnoses, mean length of stay, and whether the beneficiary died during the admission. (A single exception was a significantly higher number of secondary diagnoses for AdminaStar clients than for control group members. However, because we observe no greater length of

⁵The impacts estimated for months 1 to 6 use the full Medicare study group, while those estimated for months 7 to 12 or 1 to 12 use that subgroup for whom claims data were available for the full 12 months (that is, those randomly assigned before 1995).

TABLE VI.6
ESTIMATED IMPACTS ON HEALTH-RELATED SERVICE USE AND MORTALITY

	AdminaStar		IFMC		Providence Hospital	
	Control Group Mean	Estimated Impact (P-Value) ^a	Control Group Mean	Estimated Impact (P-Value) ^a	Control Group Mean	Estimated Impact (P-Value) ^a
Hospital Inpatient Admission						
Whether any admission, months 1 to 6 (percent)	38.0	0.0 (.99)	47.9	-3.6 (.32)	32.4	8.0* (.08)
Number of admissions, months 1 to 6	.60	0.0 (.88)	.78	1.4 (.86)	.57	.10 (.28)
Whether any admission, months 7 to 12 (percent)	30.0	0.8 (.76)	31.4	-0.3 (.93)	26.1	6.1 (.22)
Number of admissions, months 7 to 12	.53	0.0 (.68)	.51	0.0 (.89)	.40	.18* (.08)
Severity of Illness During First Inpatient Admission, Months 1 to 12						
Whether any admission (percent)	52.5	2.2 (.46)	61.4	-1.5 (.70)	46.1	10.1* (.06)
Number of secondary diagnoses	4.6	0.3** (.04)	5.3	0.0 (.86)	3.8	0.2 (.47)
Length of stay (days)	6.6	-0.4 (.39)	7.5	-0.3 (.63)	7.2	0.8 (.43)
Whether died during stay (percent)	5.1	1.2 (.54)	6.2	0.2 (.44)	6.6	-0.1 (.23)
Percentage who Died						
Months 1 to 6	8.3	1.4 (.40)	18.2	0.8 (.78)	4.7	4.0* (.10)
Months 1 to 12	15.8	2.9 (.18)	31.0	-3.7 (.32)	12.7	3.5 (.35)
Number of Observations ^b		1,110		739 ^c		420

TABLE V1.6 (continued)

SOURCE: National Claims History files 1993 through 1995; Medicare Enrollment Database (accessed in August 1996).

NOTE: Impacts on any admission and death are estimated using logit models and impacts on length of stay are estimated with Tobit models. Number of admissions and number of secondary diagnoses impacts were estimated with ordinary least squares; ordered logits gave same results. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

*The p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bStudy group includes all beneficiaries for whom Medicare claims were available. Impacts on hospital admissions during months 7 to 12 and on mortality months 1 to 12 based on those beneficiaries with complete Medicare claims for the full 12-month period: AdminaStar, 1,110; IFMC, 586; and Providence Hospital, 334.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

stay or hospital mortality for clients and because we have no reason to believe the project increased the incidence of comorbidity, we view the estimated difference as a statistical anomaly.)

As we expected, the AdminaStar and IFMC projects had no effect on mortality, although the projects' mortality rates differed considerably from each other. Eighteen percent of IFMC control group members died during the first six months after enrollment, and 31 percent died during the first year. For AdminaStar, the rates were 8 percent and 16 percent, respectively.

We do observe some weak evidence of improvement in self-reported health measures for AdminaStar and IFMC (see Table VI.7). Roughly 45 percent of control group members at each project describe their health as good or very good. A somewhat greater proportion (50 to 53 percent) of clients describe their health as good or very good. This difference was not quite statistically significant at the .10 level for AdminaStar but was statistically significant for IFMC. However, clients and control group members at each project reported spending an average of about one day in bed during the two weeks before the follow-up survey. The lack of an effect on days spent in bed, taken together with the absence of any effect on hospital use or illness severity, make it difficult to argue that the projects markedly improved client health. The observed differences are more likely to be a Hawthorne effect, or chance differences, rather than a demonstration impact.

We observe no improvement in the health of Providence Hospital clients. Consistent with the 12-month impact estimates reported in Chapter V, we observe somewhat higher rates of hospital admission among clients during the first and second six months after enrollment relative to control group members and somewhat higher mean numbers of admissions during those periods (see Table VI.6). For example, 32 percent of control group members were admitted to the hospital during the first six months, compared with 40 percent of clients. We observe no differences in our severity of illness proxies.⁶ Control group

⁶Severity of illness indicators were measured only on those with a hospitalization during the 12 months after enrollment.

TABLE VI.7
ESTIMATED IMPACTS ON SELF-REPORTED HEALTH STATUS

	AdminaStar		IFMC		Providence	
	Control Group Mean	Impact (P-Value)*	Control Group Mean	Impact (P-Value)*	Control Group Mean	Impact (P-Value)*
Rated Their Health Status as Very Good or Good (Percent)	44.3	6.0 (.13)	45.0	7.9* (.06)	51.3	2.7 (.59)
Number of Days Spent in Bed All Day Because of Illness or Injury in Last Two Weeks	1.03	.03 (.90)	1.03	-.01 (.98)	.92	.24 (.42)
Number of Observations ^a		618		556		366

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

NOTE: Impacts on health status are estimated using logit models. Impacts on days in bed are estimated using Tobit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

*The p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

members (and clients) who had hospital admissions had an average of four secondary diagnoses at admission and spent an average of seven days in the hospital during the admission. Among those admitted, about seven percent died during the hospitalization. We do observe a higher mortality rate among clients during the first 6-month period (statistically significant at the 10 percent level), but this difference is not significant over the 12-month period. We believe the six-month mortality rate difference is due to chance rather than the project. It may also partially explain the increased hospital use we observed for Providence Hospital clients. Self-reported assessments of health were the same for clients and controls; roughly half described their health as good or very good (see Table VI.7).

2. Functioning

None of the demonstration projects improved client functioning. This may be due, in part, to the fact that most control group members, despite serious medical problems, functioned relatively independently. For example, more than 90 percent of control group members could transfer from bed or chair without assistance (and more than 88 percent reported that they did so during the two weeks before the follow-up survey (see Table VI.8.) Similarly, 80 to 90 percent reported they could walk indoors without assistance (while roughly 75 percent did so), about 80 percent or more reported they could take medication without assistance (while at least half did so), and more than 70 percent could bathe without assistance (while at least 60 percent did so). In addition, improvements in functioning were hypothesized to result from improvements in health and symptom control (for example, reductions in shortness of breath or swelling of the extremities). Thus, the lack of improvement in functioning was likely partially a result of the lack of improvement in health.

We did observe a significantly lower rate of performance of two activities for Providence Hospital clients relative to control group members: transferring and bathing. Roughly 90 percent of control group members could (or did) transfer independently during the two weeks before our survey, but only about 80 percent of clients could (or did). Similarly, 70 percent of control group members bathed independently,

TABLE VI.8
ESTIMATED IMPACTS ON FUNCTIONING
(Percentages)

	AdminaStar		IFMC		Providence	
	Control Group Mean	Impact (P-Value)*	Control Group Mean	Impact (P-Value)*	Control Group Mean	Impact (P-Value)*
During the Two Weeks before the Followup Survey						
Got out of Bed or Chair Without Help	94.6	-1.7 (.38)	88.0	1.2 (.66)	90.5	-10.0** (.01)
Could Get out of Bed or Chair Without Help	95.0	0.3 (.86)	90.5	0.5 (.83)	92.6	-9.7*** (.00)
Usually Walks Alone Indoors	78.2	3.8 (.22)	76.4	-1.9 (.59)	75.8	1.1 (.79)
Could Walk Alone Indoors	90.5	-0.9 (.68)	85.4	-1.1 (.70)	83.1	0.0 (.99)
Took a Full Bath Without Help	67.7	2.9 (.41)	57.7	-0.2 (.97)	70.0	-9.9** (.03)
Could Take a Bath Without Help	78.7	3.1 (.32)	69.1	2.7 (.47)	73.8	-4.1 (.35)
Took Medications Without Supervision	67.7	0.9 (.80)	53.8	2.0 (.61)	62.4	-3.8 (.43)
Could Take Medications Without Supervision	88.9	-0.4 (.87)	78.1	4.5 (.18)	80.0	-6.1 (.15)
During the Six Months Before the Followup Survey						
Beneficiary Was:						
In nursing home/assisted living at least once	8.3	-1.6 (.46)	22.0	3.5 (.35)	14.7	0.7 (.87)
At home with formal assistance	26.2	-0.9 (.80)	27.4	-6.5* (.07)	29.4	2.8 (.57)
At home without formal assistance	65.5	2.5 (.52)	50.6	3.0 (.49)	55.8	-3.5 (.53)
Number of Observations^b		660		645		385

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

NOTE: All impacts are estimated using logit models except impacts on living arrangement, which were estimated using multinomial logit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

*The p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero

^b AdminaStar study group size varies from 616 (could walk alone, could take medication without supervision) to 660 (living arrangement). IFMC study group size varies from 560 (took bath alone could get out of bed alone, could walk alone) to 645 (living arrangement). Providence Hospital study group size varies from 362 (took medications alone) to 385 (living arrangement).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test

compared with only 60 percent of clients. (We also observed fewer clients than control group members taking medications independently, but this difference was not statistically significant.) These differences in functioning do not appear to have been due to increases in the use of either paid or informal assistance, because no such increases were observed (as noted in Chapter V).

The consistently higher levels of hospital use and lower levels of functioning (as well as the higher six-month mortality rate) suggest that Providence Hospital project clients may have been, by chance, significantly sicker and more disabled, on average, than control group members in ways that our control variables did not fully capture. The project's small size increases the possibility of such chance differences. It is also possible that random assignment was not performed correctly in this project, although we have no evidence of this. While it is possible that the case managers increased the use of hospital services, it is hard to explain how their actions could have directly led to increased functional limitation. On the other hand, lower levels of functioning among clients may have been related to the higher rates of hospitalization. Hospitalization among elderly individuals often results in a certain amount of physical deconditioning (Creditor 1993).⁷

Finally, as a summary measure of functional independence, we compared the distribution of clients and control group members (1) living in an assisted-living facility or a nursing home at any time, (2) living at home with formal assistance, or (3) living at home without formal assistance during the first six months after enrollment.⁸ Again, not surprisingly, no patterns emerged of increased independence among clients relative to control group members. Most lived at home without formal assistance (50 percent for IFMC and 66 percent for AdminaStar). Relatively few had been in a nursing home or assisted-living facility

⁷Questions concerning functioning were not asked of proxy respondents for deceased beneficiaries. Thus, the lower levels of functioning could not be associated with the difference in mortality rates.

⁸If a beneficiary had spent any time during the six months preceding the survey in a nursing home or assisted-living facility, he or she was in the first category. Only those who reported spending no time in these types of residences were put in the second or third category.

during the first six months (from 8 percent of AdminaStar control group members to 22 percent of IFMC control group members).

D. DEMONSTRATION IMPACTS ON SATISFACTION

Client satisfaction is an important subjective measure of the overall quality of case management. The follow-up survey contained questions about satisfaction with service arranging—one of case management’s primary components—and satisfaction with care more generally.

1. Satisfaction with Service Arranging

The survey asked respondents to assess the ease of arranging for transportation to medical care, getting prescriptions filled, and arranging for other services (such as medical care, homemaker services, or home-delivered meals) during the six months before the survey. They were asked to rate service arranging as very easy, somewhat easy, somewhat difficult, or difficult. (Respondents who reported they had no experience with this type of service arranging were not included in the comparisons.) Satisfaction with service arranging even among control group members at all three projects seemed to be high (see Table VI.9). Eighty percent or more assessed each of the types of service as easy or somewhat easy to arrange.

Only IFMC appeared to increase client satisfaction with medical transportation arrangement: 86 percent of clients, compared with 80 percent of control group members, reported it was easy or somewhat easy to arrange medical transportation. Providence Hospital clients were somewhat less satisfied than control group members with all types of service arrangement but significantly less satisfied with arranging for medical transportation. These results for Providence Hospital, like the others reported above, were perverse. The satisfaction results are especially odd, given that Providence Hospital case managers devoted more effort than those at the other projects to service arrangement. The higher levels of dissatisfaction may be due to the greater needs of such clients, if they were (by chance) in poorer health. Case managers may also have raised clients’ hopes of getting added services before finding out they were not available, thereby increasing dissatisfaction.

TABLE VI.9
ESTIMATED IMPACTS ON SATISFACTION
(Percentages)

	AdminaStar		IFMC		Providence	
	Control Group Mean	Impact (P-Value) ^a	Control Group Mean	Impact (P-Value) ^a	Control Group Mean	Impact (P-Value) ^a
Satisfaction with Service Arranging^b						
Found It Easy or Very Easy to Arrange for Transportation to Medical Care	82.8	3.2 (.29)	79.5	6.5** (.04)	83.3	-7.2* (.09)
Found it Easy or Very Easy to Fill Prescriptions	88.0	-0.8 (.75)	92.0	-2.8 (.23)	90.3	-5.5 (.11)
Found It Easy or Very Easy to Arrange for Medical Care, Homemaker Services, Home-Delivered Meals, or Other Services	81.5	2.8 (.46)	86.8	2.6 (.44)	79.5	-1.3 (.82)
Did Not Feel Needed More Help with Personal Care	75.1	1.2 (.72)	79.7	1.7 (.58)	68.5	-2.7 (.56)
Satisfaction with Care						
Found it Easy or Very Easy to Obtain Answers to Questions About Treatments	83.3	4.0 (.16)	84.8	3.0 (.27)	85.9	-3.7 (.32)
Found the Advice Received About Prevention Was Good or Excellent	88.3	6.0*** (.01)	87.3	3.6 (.17)	87.7	-2.3 (.53)
Felt the Overall Quality of Care Was Good or Excellent	92.3	0.4 (.85)	86.4	4.1* (.10)	91.8	-6.0* (.06)
Number of Observations^c	661		643		386	

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

NOTE: Impacts are estimated using logit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member. See Appendix Tables D.6, D.7, and D.8 for estimated coefficients on all control variables for the three satisfaction with care outcomes.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero

^bAnalysis is for those beneficiaries who tried to arrange services. We tested to see if there were differences in the percentages who tried to arrange services and found only two significant differences—clients for AdminaStar were more likely to have tried to arrange for transportation and to arrange for other services.

^cAdminStar's study group size ranges from 381 (other services) to 661 (help with personal care). IFMC's study group size ranges from 379 (other services) to 643 (quality care). Providence Hospital's study group size ranged from 221 (other services) to 386 (help with personal care).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

Roughly equal percentages of clients and control group members within each project reported they did not need more help with personal care or with chores around the house. The levels reporting they had sufficient help varied by project, from about 69 percent at Providence Hospital to 80 percent at IFMC.

2. Satisfaction with Overall Care

Projects sought to increase and improve communication between clients and their physicians. This effort was in response to the projects' belief that many elderly people typically did not like to "bother" their physicians with questions and often did not know how to ask questions of physicians in a way that would lead to understandable responses. The six-month follow-up survey asked beneficiaries to assess whether it was very easy, somewhat easy, somewhat difficult, or very difficult to get answers to questions about their condition, tests, or treatments during the six months before the survey and whether the health-related prevention advice they received during that period was excellent, good, fair, or poor. Responses to these questions were likely to reflect satisfaction with care provided by physicians and, for clients, by case managers.

More than 80 percent of control group members for each project reported that it was very easy or somewhat easy to get questions answered (see Table VI.9).⁹ Respondents were also asked to assess advice received about "ways to avoid illness and stay healthy." More than 85 percent of control group members rated this advice as good or excellent.

Given these high levels of satisfaction, it is not surprising that (with one exception) projects were unable to increase satisfaction with information and prevention advice. The exception was that 94 percent of AdminaStar clients, compared with 88 percent of control group members assessed their prevention advice as excellent or good. This difference is consistent with our finding that AdminaStar had the most focused educational intervention of the three projects.

⁹See Appendix Tables D.6, D.7, and D.8 for estimated coefficients for satisfaction with care outcomes.

The estimated impacts on beneficiaries' ratings of the overall quality of the care they received during the six months before the survey varied widely across the three projects. Again, control group ratings were high. More than 90 percent of AdminaStar and Providence Hospital control group members rated care as excellent or good; the comparable figure for IFMC was 86 percent. Client ratings were similar to those of the control group for AdminaStar. IFMC clients, however, were somewhat more likely to rate overall care as good or excellent than were control group members. Providence Hospital clients, on the other hand, were less likely than control group members to rate care as excellent or good. Only 85 percent of clients did so, compared with 92 percent of control group members.

We conclude that the demonstration had isolated effects on satisfaction. AdminaStar clients were more satisfied with prevention advice; IFMC clients were more satisfied with medical transportation arrangements. These findings are consistent with the relative focus of the two projects. Providence Hospital clients were less satisfied with service arranging and care in general, however. The last finding is particularly perplexing in light of the high level of effort Providence Hospital case managers dedicated to service arranging. It is possible that, in observing the efforts of the case managers, clients were provided with a window on the difficulties of service arranging that they would not have otherwise had; this, in turn, might have colored their perceptions of the difficulty with arranging care and with overall care quality.

E. DEMONSTRATION IMPACTS ON CLIENT SUBGROUPS

Although the demonstrations overall resulted in improvements only in a few isolated measures of care quality for different projects, they still may have been effective for particular subgroups of clients. The subgroups we examined were described in Chapter V. We estimated subgroup impacts using one key quality outcome measure that applied to all beneficiaries in all three projects: whether the beneficiary was hospitalized during the six months following enrollment. For beneficiaries with CHF (that is, all AdminaStar beneficiaries and 70 percent of those at IFMC), we also estimated subgroup impacts on two additional outcomes: medication regimen adherence and control of swelling in the extremities.

We found no patterns of impacts that suggested the projects improved care quality for any particular subgroups of clients. We observed a few isolated statistically significant estimates, but none that applied to more than one of the outcomes examined. (Subgroup impact estimates for each project appear in Appendix D, Tables D.1, 2, and 3.)

Thus, we conclude that the demonstrations were only able to improve care quality in a very limited way overall and were not any more effective in improving quality for particular groups of clients.

VII. CONCLUSION

The three case management projects each enrolled individuals with high health care costs but had no discernible impact on use of Medicare-covered services. Furthermore, the projects had much lower rates of participation than expected among eligible beneficiaries and had little effect on the health behaviors of those who did participate. It is unclear whether the failure of these demonstrations to reduce Medicare costs is due solely to weaknesses in the design of the specific interventions or to fundamental problems with case management as a cost-saving device. The body of research assessing the effectiveness and costs of case management interventions similar to those implemented in this demonstration is limited and its conclusions are mixed. However, this research does suggest that major changes in how case management was organized, implemented, and paid for might have led to lower medical costs. In particular it suggests that effective case management requires the focused, coordinated efforts of physicians, case managers, and clients. Even if changes were made, however, it would have been difficult to generate enough savings to offset case management costs.

A. SUMMARY OF FINDINGS

The three case management projects targeted their case management efforts to different types of beneficiaries, emphasized different services to clients, and differed in the extent to which interventions were standardized.

AdminaStar offered its services only to beneficiaries admitted to the hospital for congestive heart failure (CHF) within the prior year, who were identified through claims files. It provided a two-year, highly structured intervention, using only telephone contacts. The project, implemented statewide, focused on educating clients about CHF and how to improve self-care. AdminaStar did relatively little service arrangement.

Providence Hospital enrolled clients with several serious or chronic health conditions, most of whom were identified during a hospitalization. Most client contact during the one-year project was by phone, but case managers performed initial assessments in person and saw clients in person for quarterly reassessment and at other times if warranted. Providence emphasized service arrangement and coordination, and public assistance advocacy, while focusing less on condition-specific education.

The Iowa Foundation for Medical Care (IFMC) fell between the other two projects on all dimensions. It offered services for one year to clients with either CHF or chronic obstructive pulmonary disease (COPD), drawing its enrollees mainly from beneficiaries being discharged from 10 hospitals in several areas of Iowa and Nebraska. However, IFMC also relied on claims data to identify beneficiaries in these areas with these conditions who had recently been discharged from a hospital. It also did most client contact by telephone, but had occasional in-person contact. The project provided a mixture of education and service arrangement, with less emphasis on and a less structured approach to education than AdminaStar but with more attention to service arranging. Both the IFMC and Providence Hospital interventions left more of the case management content to the case managers' discretion than did AdminaStar.

1. Projects Enrolled High-Cost Clients; Intervention Costs Varied

All three projects enrolled beneficiaries with much higher than average Medicare costs, hospital admission rates, skilled nursing facility and home health use, and death rates during the follow-up period. Average Medicare costs for the year after demonstration enrollment for the three control groups ranged from \$10,500 for AdminaStar to over \$16,000 for Providence. Control group members' Medicare costs per month alive (and not in a health maintenance organization [HMO]) were \$957 for AdminaStar, \$1,358 for IFMC, and \$1,460 for Providence Hospital. These costs were two-and-a-half to four times the national average for all Medicare beneficiaries in 1994. The proportion of control group members admitted to a hospital during the year after enrollment ranged from 46 to 61 percent, 29 to 58 percent incurred home

health care costs, and about 10 percent were admitted to a skilled nursing facility. Death rates during the 12 months after enrollment ranged from 13 percent for Providence Hospital clients to 31 percent for IFMC clients.

The projects also varied widely in the amount of time spent providing case management to clients and the case management cost per client month. AdminaStar spent less time on average with clients than the others, and cost less (\$130 per client month). Providence Hospital spent the most time with clients and cost the most (\$373 per client month). IFMC again fell in the middle of this range, at \$190 per client month. In all three projects, only a fraction of the project costs were for case managers' time spent with clients. The proportion of total costs spent on case managers ranged from 33 percent (Providence and IFMC) to 51 percent (AdminaStar).

2. Participation Was Low and Did Not Affect Self-Care

Participation rates were much lower than had been expected for all three projects. Rates were 32 percent of eligibles for IFMC and 26 percent for Providence Hospital. AdminaStar assessed eligibility only for interested beneficiaries. Only 14 percent of the potential eligibles contacted consented to participate and were subsequently found to be eligible for the project. Reasons for the high refusal rates included (1) beneficiaries being either too ill or too well to benefit from case management (in the opinion of the beneficiary or their physician), (2) fears about loss of Medicare services or hidden costs, (3) a general mistrust of "managed" care among Medicare beneficiaries during the time period when demonstration enrollment took place, (4) physicians viewing the project as an intrusion on their practice, and (5) the timing of the offer (some beneficiaries who were approached when they were still in the hospital did not want to discuss the possibility of further treatment in their home). Physician refusal was a particular problem for IFMC, which had a reputation among physicians as being punitive, stemming from its role as a Peer Review Organization for the Health Care Financing Administration (HCFA).

Although refusal rates were high, most beneficiaries who did enroll in the projects were pleased with the services they received. As might be expected, AdminaStar clients were more likely than clients of the other projects to give high marks to the education they received, while IFMC and Providence Hospital clients were more likely to feel the project helped them get needed support services. Many felt that case management had been a big help to them, and relatively few voluntarily dropped out (2 percent and 8 percent, respectively, over the one-year Providence and IFMC demonstrations, and 12 percent over the two-year AdminaStar demonstration).

Despite clients' satisfaction, the interventions generally had little effect on clients' self-care practices or symptoms. The only significant effect on practices was that AdminaStar's clients increased their adherence to the recommended daily weight monitoring and somewhat improved control of shortness of breath. We found no effects on the proportion of clients who (1) missed doses of prescribed medicine, (2) heeded their doctor's advice to quit smoking, (3) monitored their blood pressure regularly, or (4) practiced other behaviors recommended for their condition (such as breathing exercises or getting flu shots). Consequently, we observed no significant effects on symptoms such as abnormal weight gain, swelling of extremities, or the need for antibiotics.

3. Use and Cost of Medicare Services Was Not Reduced

Given the absence of marked effects on behavior, it is not surprising that none of the projects reduced hospital admission rates and costs. In their applications to be demonstration sites, the projects had each indicated large expected reductions in hospital use. AdminaStar predicted a 30 percent decline in Medicare Part A costs. Providence expected to reduce admission rates by 17 percent, and IFMC anticipated a 30 percent decline in number of admissions. However, none of the projects lowered hospital use even slightly during the demonstration period. For AdminaStar and IFMC, the client-control differences in hospital admissions, hospital days, and hospital costs were very small and statistically insignificant. For Providence Hospital, the estimated effects on these measures were statistically

significant but positive, suggesting that the intervention increased the proportion of clients admitted to a hospital by 10 percentage points (from 46 to 56 percent), and increased the average number of admissions by 34 percent. Whether these are true demonstration effects or simply chance differences is difficult to determine. Case managers may have identified some clients in need of an admission. Alternatively, since the project was hosted by a hospital, it may have been especially receptive to admitting project clients for observation or treatment. In any case, it is clear that case management did not have the *intended* effect on hospital use.

The projects also did not reduce the use of other Medicare services. While use of some services (for example, physician visits) might have been expected to increase as a result of the case managers' monitoring, the expectation was that better self-care and monitoring would reduce the need for most services. The use and cost of skilled nursing facility, home health, hospital outpatient, emergency room, and physician services were not significantly lower for the clients than for control group members in any of the projects. For emergency room and hospital outpatient services, use and costs were significantly higher for Providence clients than for the control group.

We also found almost no evidence suggesting that the case management projects were effective for subgroups of clients for whom the interventions were expected to be most beneficial. Impacts were not consistently greater for clients who were younger, better educated, unmarried, in rural areas, poorer, greater users of services in prior year, or more recently hospitalized than for other patients. The only difference potentially due to demonstration effects is the significantly lower hospital use for AdminaStar clients whose CHF was caused by certain conditions for which adherence to diet and self-care practices is especially critical. For beneficiaries with other causes for their CHF, however, client use of hospital care was significantly *greater* than that of comparable control group members. Thus, it is difficult to make a convincing argument that clients' lower observed hospital use among one group of CHF patients is due

to the effects of the intervention, but its higher use of hospital care among the other group of CHF patients is not due to the intervention.

B. WHY WERE THERE NO IMPACTS?

On the basis of our site visit discussions and several published studies of case-management interventions, we have identified four primary reasons for the lack of project impacts on costs or health behaviors:

1. Clients' physicians were not involved in the interventions.
2. The projects did not have sufficiently focused interventions and goals.
3. Projects lacked staff with sufficient case management experience and specific clinical knowledge to generate the desired reductions in hospital use.
4. Projects had no financial incentive to reduce Medicare costs.

Case managers received *little or no cooperation from clients' physicians*. Most refusals at IFMC came from physicians on behalf of their patients, and a substantial proportion of refusals at Providence were due to physicians. (AdminaStar did not require the approval of a client's physician but tried unsuccessfully to engage physicians in ongoing case management.) Among those who did agree to have their patients enrolled, most wanted little interaction with the case manager. Although some physicians came to view the case managers as a useful allies, most essentially ignored the case managers. This was especially true in AdminaStar, which made all of its contacts with clients and physicians' offices by phone (or mail). Thus, there was no opportunity for case managers and physicians to develop a rapport. The case managers at all three projects felt that they would have been more effective if they and the physicians had coordinated their advice to clients and if physicians had generally supported their efforts. With a team approach, the physicians might have been able to draw on input from the case manager about whether to see clients first instead of admitting them directly to a hospital or sending them to the emergency room.

In addition clients might have been more likely to adhere to case managers' advice if their physician had told them that a case manager would be calling with further instructions. Even in the Providence Hospital project, where the hospital employed the case managers and physicians, the case managers stated that the physicians did not think about case management much after consenting on behalf of a patient.

The *lack of focus* of the projects was reflected in several project-specific dimensions. Providence Hospital, for example, took clients with a variety of illnesses. This made it difficult for the project to develop and train case managers on the comprehensive, disease-specific education on self-care for each of the diseases that probably would help to reduce the need for hospital admissions. The IFMC and Providence Hospital projects also had very little structure to their case management efforts. These projects provided little guidance on the types of activities on which the case managers should concentrate their time, how frequently clients at different levels of severity should be contacted, or the content of the education provided. Only AdminaStar had well-developed educational protocols and formal guidelines for client contact. The projects also made little formal use of client outcomes. For example, clients were not consistently and systematically monitored to determine who had been admitted to a hospital and whether the admission was attributable to poor self-care or was otherwise avoidable. The level of attention two projects devoted to service arrangement may also have been ill advised for projects whose primary goals were improved health and lower health care costs. Having case managers arrange for support services may contribute to client satisfaction, but no evidence exists that additional community resources lead to measurable reductions in hospital readmissions and costs (see, for example, Wooldridge and Schore 1988).

Most of the *case managers lacked in-depth condition-specific expertise and extensive case management or community nursing experience*, although nearly all were nurses. The case managers received several days of initial training to review project procedures and clinical topics, and some completed in-service training or attended seminars. It appears that this limited training may be an

inadequate substitute for a more comprehensive background in the clients' disease and in community-based care or case management. Our review of selected cases (by a nurse who specializes in case management) revealed several oversights by project case managers. The importance of social and environmental factors in improving the health of a client may be underestimated by nurses with no experience in community nursing. Rich et al. 1995 cite the importance of the case managers' condition-specific training to the success of their case management intervention for CHF patients. Nurses with little experience with a disease may be ill equipped to identify unusual symptoms or to be able to distinguish serious symptoms or side effects of treatment from ones that are of relatively minor significance.

A final reason for observing no impacts on service use, costs, or health outcomes may have been that the projects had *no financial incentive* to produce such outcomes. Case managers focused on providing education or arranging services but had no target outcomes (such as holding hospital admission rates below, say, 30 percent). If payment to the case management project for services delivered had been based in part on measurable outcomes, the projects might have monitored the outcomes more closely and focused their efforts more consistently on activities that would best facilitate these specific outcomes.

C. HOW MIGHT CASE MANAGEMENT BE EFFECTIVE IN A FEE-FOR-SERVICE SETTING?

Our search for evidence that some form of home-based, educationally oriented case management can yield cost savings identified three published studies (Rich et al. 1995; Naylor et al. 1994; and Wasson et al. 1992) and two ongoing case management programs with promise (Ralin 1996; and Donlevy 1996). Each suggests that a focused case management intervention with a structured educational component, carefully chosen and trained staff, and strong integration with physicians can lead to markedly lower medical costs for CHF patients. The two ongoing case management programs, which focus only on CHF patients, include one grant-funded project conducted by a rural hospital in the fee-for-service sector and one program conducted in several HMOs by an independent contractor. Both of the ongoing case

management programs claim to have produced large reductions in hospital use and total health care costs. However, the comparison methodology used to produce the estimated savings is not well documented and appears to be highly questionable. Although both emphasize the importance of the same features that we identify above as being necessary for a successful case management intervention, the weakness of their cost-savings estimates limits their credibility.

1. Evidence of an Effective Case Management Intervention

The best hard evidence that case management can reduce medical costs comes from a published study (Rich et al. 1995) of a recent demonstration in a fee-for-service setting. This multidisciplinary intervention, at Jewish Hospital in St. Louis, was specifically designed to prevent the hospital readmission of elderly patients with CHF. On the basis of a randomized trial, the authors concluded that a multifaceted intervention comprised of discharge planning, comprehensive education of the patient and their families, a prescribed diet, social service consultation and planning, a review of medications, and intensive followup resulted in a halving of the 90-day readmission rate for CHF patients, improved quality of life, and lowered total costs. The finding is consistent with other studies (see, for example, Graham and Livesley 1983), suggesting that one-third to one-half of the readmissions for certain high-risk conditions are potentially preventable and Thornton et al. (1991), showing that 20 percent of hospital admissions in the elderly population are due to noncompliance with drug regimens or improper prescribing.

Rich et al. attribute the effectiveness of the intervention to “the focused nature of the intervention and the fact that it had multiple components.” In this study, described by the authors as “nurse-directed,” an experienced cardiovascular nurse conducted most of the education and client interaction and was clearly an integral part of the client’s team, not an independent agent. The study focused on a single condition, and the nurse provided intensive education, using a teaching booklet the study team developed specifically for elderly patients with CHF. A dietitian performed client-specific dietary assessments and prepared instructions, which the nurse reinforced while the patient was still hospitalized. A geriatric cardiologist

reviewed and simplified the clients' medication regimens, and the study nurse taught the clients about each medication and the dosing regimen.

At discharge, the study nurse completed a summary form describing prescribed medication, dietary guidelines, and activity restrictions. The form was passed on to a nurse from the hospital's home health care division, who visited each client three times during the first week after discharge. This home health nurse reinforced the client's education, reviewed medications, diet, and activity guidelines, and performed a general physical assessment and cardiovascular examination. The study nurse contacted clients by telephone to assess their progress, answer questions, and encourage them to call study personnel at any time concerning questions, problems, or symptoms.

None of the three demonstration projects matched this level of intensity or staff skill level. AdminaStar was perhaps the closest, with its focused, structured education intervention and its limitation to CHF patients. However, the case managers were not generally cardiology nurses with experience in community nursing, there was no opportunity for in-person client contact, the case manager was not part of a team with the client's physician, nor did trained specialists assess the client's diet and medication regimen and coordinate their efforts with the case manager. Furthermore, the clients were not intercepted at the time of hospitalization, but several months later. Thus, there was no opportunity for the case managers to be involved in discharge planning or to help educate the client when drug, diet, and exercise regimens were first prescribed. The likelihood of making the case manager part of the client's care team is also reduced if case managers are not involved at the time of hospitalization. The other two projects had somewhat more in-person contact and enrolled most of their clients while they were still hospitalized, which could have allowed the case managers to be involved at this stage. However, these potential advantages of early contact with the client were not realized. Furthermore, neither project concentrated on client education in a structured way, and Providence Hospital included clients with several acute and chronic illnesses, effectively eliminating the possibility of a focused educational intervention. Like

AdminaStar, neither of these projects required that case managers be nurses who specialized in caring for clients with the target conditions in a community setting nor incorporated reviews of diets and medications by trained professionals. Thus, in hindsight, the absence of impacts on hospital readmissions in these three demonstrations may be understandable.

In addition to these design features that seem to be important in reducing readmissions, case management interventions could have learned much from focused monitoring of the clients and greater attention to client outcomes. For example, when readmissions occur, the case manager physician team should assess them to determine if they were preventable. What led to the readmission? Was the client not adhering to advice concerning diet, medication, smoking, or exercise? Were there symptoms the client did not recognize as signaling an acute exacerbation? How do the “successes”--those clients who avoid readmissions--differ from those who are readmitted? Is case management especially effective or ineffective for some types of client attitudes, characteristics, or family situations? Can the intervention be modified to address any identified barriers to adherence? These assessments of ways to enhance effectiveness could benefit from group discussions about particular clients involving the client’s case manager and physician, other case managers, those who train and supervise the case managers, and the project director. A second type of potentially helpful ongoing monitoring of the intervention is comparison of outcomes across individual case managers. Is client adherence with recommended behavior higher for some case managers than others? If so, why? How can less effective case managers be trained to become more effective?

2. Cost Savings May Not Cover Case Management Costs

Even if case management can lower Medicare costs for medical services, the reductions may not be enough to offset the cost of case management. The Rich et al. (1995) study found that the Jewish Hospital intervention saved enough money on hospital admissions to more than cover the cost of case management. The case management costs reported (\$72 per client per month), however, are much lower than those

recorded by our demonstration projects, despite the fact that the Jewish Hospital intervention was more resource intensive. This may be, in part, because the Jewish Hospital project did not spend resources recruiting patients, recruiting and training case managers, and engaging in other activities included in the demonstration projects' costs. However, the Jewish Hospital project also did not report start-up costs, overhead costs, or some other costs that would be incurred in an ongoing case management program. Thus, reliable case management cost estimates are needed to provide convincing evidence that savings will be achieved if impacts on hospital readmissions are within the range the Jewish Hospital intervention found.

Unless more effective case management can be provided for no more than the costs in two of the demonstrations evaluated here, it is not likely to be cost-effective. The lowest estimate of total billed costs for the three projects, \$130 per client month for AdminaStar, was approximately 14 percent of the \$957 average Medicare cost per month alive incurred by these clients during the year after enrollment. IFMC had higher case management costs (\$190), but higher Medicare costs as well (\$1,358 per month alive), yielding essentially the same ratio of case management costs to Medicare costs. This may be the maximum proportion of costs that can be incurred for case management if there are to be sufficient net savings to provide adequate financial incentive to case management providers and saving to HCFA. The Jewish Hospital intervention cut medical costs by about 23 percent during the three-month intervention. If that figure is an accurate estimate of the expected percentage savings from effective case management, the net savings from a program with case management costs like AdminaStar or IFMC would be about 9 percent of medical costs (23 percent minus 14 percent). Smaller amounts of expected savings may not generate sufficient interest on the part of either HCFA or potential case management contractors, given that the net savings must be distributed between them.

For the Providence Hospital project, case management would have to have been both more effective and less costly. The average monthly case management costs (\$373) were 26 percent of the monthly \$1,460 medical costs, leaving no savings to distribute if Medicare costs can only be cut by 23 percent.

The potential appears to exist, however, to provide more effective case management without increasing costs over those observed in this study. A significant fraction of the costs of the IFMC and Providence projects was for recruiting patients and verifying eligibility. These costs should be lower in an ongoing, physician-integrated case management project conducted by a hospital, physician group, or home health agency. Furthermore, the proportion of costs spent on case management staff was relatively low in all three projects. AdminaStar spent only half of its funds on the wages and salaries of case managers and supervisors. The other two projects spent about one-third of their total costs on these salaries. It should be feasible to keep other labor and nonlabor costs well below two-thirds of the total costs of a case management intervention.

D. MODELS FOR IMPLEMENTING CASE MANAGEMENT IN FEE-FOR SERVICE MEDICARE

The ability of case management to yield lower Medicare costs will depend on the setting in which case management is implemented and how it is paid for. The Rich et al. study suggests that a hospital setting can provide the greater focus, optimal staffing, and physician involvement necessary for case management to reduce admissions. However, hospitals have no resources to pay for case management, nor do they have an incentive to do so. On the other hand, strong financial incentives in other settings may not yield effective case management. Unless clients' physicians work closely with the case managers, case management is unlikely to succeed. Physician involvement is much more likely in some settings than others.

We have identified three testable models for financing case management that might yield savings, and a number of payment and organizational issues that would have to be resolved for it to work. Table VII.1 summarizes the issues discussed below.

TABLE VII.1

IMPLEMENTATION ISSUES FOR CASE MANAGEMENT

	Payment Arrangements		
	Capitation for Medicare Services for Patients with Specific Illnesses	Sharing of Medicare Cost Savings; No Payment for Case Management	Direct Payment for Case Management with Bonus for Savings
Payment	Covering all Medicare services needed or Covering only Medicare services associated with specific disease	No program payment unless Medicare costs are below expected amount	Covers only case management services
Coverage Period	Fixed postdischarge interval (for example, six months) or Fixed period beginning with admission	Fixed postdischarge period	Fixed postdischarge period or until case management no longer needed
Rate Setting	Set at percentage of expected cost for covered medical services over at-risk interval	Medicare cost reductions relative to expected costs shared with contractor (majority to contractor to cover case management costs and greater risk)	(1) Fixed rate paid per person month, or (2) Cost-based, with ceilings/guidelines like home health Rate set below expected cost of case management (adjusted for case severity; could decline with time since enrollment) HCFA recoups case management payments from savings in Medicare costs and shares any additional with contractor
Contractor/Case Management Provider	Hospital, large physician group, or insurer	Hospital, large physician group, home health agency, or insurer	Hospital, large physician group, home health agency, or insurer
Advantages	Guarantees known level of savings (if rates set accurately and no biased selection) Strong incentive to provide cost-effective case management Low administrative costs for providers and HCFA	No risk of cost increases to HCFA (if rates set accurately and no favorable selection) Guaranteed share of any Medicare cost savings	Potential for greater savings to Medicare Less incentive for cream skimming
Potential Problems	Cream skimming or selective participation Restricted access to or delays of medical services Contractors lack of control over "out-of-plan" use may deter participation Difficulty of limiting capitation to costs associated with client's condition Inequities relative to risk contracting Medicare cost savings may go mostly to contractor, not HCFA	Random or preexisting difference indistinguishable from real reductions Weak incentive to invest in strong case management Cream skimming (less than capitation) Restricted access to or delay of medical services (less than capitation) Administrative costs of calculating savings	HCFA loses money if case management not effective Overlap with home health (if contract with home health agency) Less integration with physicians (if contract with home health agency)

1. Capitation for Medicare Services for Beneficiaries with High-Cost Conditions

Under this option, organizations capable of assuming financial risk would receive a fixed predetermined amount for each beneficiary with a high-cost diagnosis (such as CHF). The payment would cover all of the Medicare-covered services required by the beneficiary during a fixed period (for example, one year) following discharge from a hospital for the target diagnosis.¹ This approach is a postacute analog to an existing demonstration project that pays hospitals a fixed amount for the bundle of physician and hospital services required for inpatient care of patients admitted for Coronary Artery Bypass Graft (CABG) surgery. The payment would be set at a rate below the expected Medicare reimbursements for such beneficiaries. It would then behoove the contractor to reduce the need for readmissions and other expensive care, and condition-specific case management could be an attractive means for doing so. The government could require that case management be provided, or leave that to the contractor.

The optimal type of contractor for a capitation payment approach might be hospitals or large physician groups that specialize in one or more of the diseases for which case management might be effective. Either setting would enable the case manager to be an integral part of a multidisciplinary team. The beneficiary would be well known to the case management team, and working relationships should be well established. The hospital or physician group would have the detailed knowledge of the condition necessary for the program to be successful. Alternatively, a Medigap insurer could contract with HCFA to assume financial responsibility for the care of their Medicare beneficiaries who are eligible and willing to participate in a case management intervention. However, some method of ensuring physician involvement would be necessary in this case.

This capitation approach has several advantages, including a high likelihood that HCFA would save money. Savings to HCFA are guaranteed if beneficiaries for whom the capitation is paid are representative

¹A variant would be to make a single payment at the time of admission that would cover the cost of both the inpatient stay and post discharge care needed.

of the group of beneficiaries on whom the payment amount is based, and the rates are accurately calculated. Some administrative costs would also be limited, because no documentation and auditing of case management costs would be needed.

There are, however, several disadvantages to a bundled capitation approach. The fixed at-risk period creates the incentive for the provider to restrict access to or delay services. It also creates the incentive for providers to “cream skim”—select only those patients with the best prognosis or those most likely to comply with recommendations. To minimize such behavior, it may be necessary to further limit eligibility to beneficiaries with certain high-risk characteristics, require contractors to accept all beneficiaries who meet the eligibility criteria, or have a case mix adjuster to vary the payment amount with beneficiaries characteristics.

Another disadvantage is that many of the costs that beneficiaries will incur may be unrelated to the disease being case managed. A possible modification would be to restrict the costs covered under the capitation to ones associated with the condition for which the payment is being made (for example, CHF). However, it is often difficult to determine which health care costs are attributable to a particular condition and which are due primarily to other conditions. This problem would be particularly difficult to overcome, because beneficiaries with the types of conditions likely to be considered for such a “bundled” program often have at least one serious comorbid condition. On the other hand, including all types of care needed may expose providers to more risk than they are willing to assume. For example, a man admitted for CHF could be diagnosed two months after discharge as also having prostate cancer. Under this capitated system, treatment for the cancer would have to be paid for by the capitated provider, although the provider may have little or no expertise in cancer treatment.

Another problem with the capitation approach is that beneficiaries presumably would not be required to obtain all of their care from the contracting provider. Without the freedom to choose their providers, many Medicare beneficiaries probably would be reluctant to participate. However, allowing such freedom

again creates a large risk for the capitated entity. If beneficiaries were locked into receiving services from the contracting provider, procedures would have to be established for beneficiaries to appeal if desired treatment is denied. (Similar safeguards are required for HMOs and are receiving increased attention from states' legislative and judicial branches.)

The potential for biased selection of high-cost beneficiaries out of HMOs and into such arrangements as this also would be a major source of concern. Paying a large capitation rate to hospitals or physician groups for these beneficiaries creates a potential problem because Medicare risk plans in the area would receive much lower amounts for enrollees with the same conditions. The current Average Adjusted Per Capita Costs (AAPCC) formula does not take medical conditions into account in determining the capitation rate. This situation could lead participating hospitals or physicians groups to encourage enrollees to disenroll from their HMO. While HMOs could also be paid higher capitation rates for these beneficiaries, budget neutrality would require lowering the AAPCC rates paid for beneficiaries without the target conditions.

The capitation model also may result in the majority of the savings going to the contractor rather than to HCFA. If the capitation rate is set at, say, 90 percent of expected Medicare costs, but contractors can achieve 30 percent reductions, two-thirds of the savings will accrue to the contractor. Setting the rate at a lower percentage of expected costs may discourage participation, however. In addition, the contractor's share of cost savings must cover the cost of any case management efforts.

2. Sharing of Medicare Cost Savings

One way around many of the problems with capitation for Medicare services would be to pay all providers the usual fee-for-service rates for Medicare services rendered, with a bonus to the case management contractor for holding down postdischarge Medicare costs (see Column 2 of Table VII.1). The bonus would be paid if costs for beneficiaries in the risk group fall below some predetermined level based on local area experience in prior years.

This model could be implemented with various types of contracting agents, including hospitals, physician groups, home health agencies, or insurers. Because payment for Medicare services would be under the usual fee-for-service method, there would be no need to restrict participation to entities capable of bearing large financial risk. Each of these types of entities is capable of providing the staffing, physician, integration, and focus required to produce cost savings from case management. If the target amounts for the average Medicare costs used to calculate true savings are reliable estimates of what the beneficiary would have cost in the absence of case management, the government incurs no risk of losing money and guarantees a known share of any cost savings generated.

This approach could be successful but has several potential disadvantages. One problem is that it reduces the financial incentive to invest significant sums in the types of case management necessary to achieve reductions in readmissions. This drawback could be overcome by contracting only with entities that agree to implement the case management procedures already found to be cost-effective. However, the contractor bears all of the losses if case management does not generate sufficient savings in medical costs to offset case management costs, which could deter participation. In addition, the possibility of biased selection still exists. Participating hospitals or physician groups may refer to other providers (possibly even subsidiaries) those cases that are most likely to require a readmission or expensive postacute care to lower the likely average postdischarge costs for the beneficiaries served. Safeguards against such behavior would be necessary. Administrative costs would also be somewhat greater because of the need to calculate savings. Cash flow could also be a problem if savings are only distributed several months after the case management costs are incurred.

A major problem with this approach is that it may encourage organizations to participate with the expectation of doing minimal case management and hoping for windfall gains, due to chance differences in costs or to favorable selection. The problem arises because it would be difficult to distinguish true savings from random differences across contractors in the average Medicare costs of their beneficiaries.

Suppose two identical organizations contracted with HCFA to provide case management in an area, and case management had little effect. Suppose further that, by chance, one contractor's beneficiaries had Medicare costs considerably below the average and one had costs well above the average. In this case, the first contractor would profit undeservedly, the second would lose the amount invested in case management, and HCFA would lose money overall. The likelihood of these consequences could be minimized by basing cost projections on the experience of beneficiaries served by the contractor in prior years and by limiting participation to organizations that treat a sizeable number of beneficiaries with the target condition. Requirements could also be imposed on the type and amount of case management provided. Adjustments to target cost levels for differences in severity of illness would be necessary. HCFA could also cap bonus payments by requiring that total Medicare costs for all case-managed beneficiaries in a given area, plus bonuses to case management contractors, be less than the expected cost in the absence of the intervention.

3. Direct Payment for Case Management with a Bonus for Savings

A third alternative that would probably generate greater interest in participation than either of the other alternatives, but puts HCFA at greater risk of losses, is to pay contractors directly for providing well-designed case management. The payment to contracted agencies could be set equal to their actual costs or a predetermined rate based on expected cost. A bonus would be paid for holding beneficiaries' average Medicare costs below a preset target level. Alternatively, the payment could be set below the actual or expected cost, so that agencies would be at some risk of not recovering their full cost if they did not reduce beneficiaries' total Medicare costs. Under this type of payment arrangement, the case management providers again could be hospitals, physician groups, home health agencies, or insurers.

Having home health agencies provide the case management could be particularly appealing. Home health agencies are experienced in educating patients about self-care and in providing community-based care. Furthermore, many home health agencies employ social workers on whom they could draw if

needed, to coordinate support services such as home-delivered meals and transportation. Some agencies also have dietitians on staff or on call. On the other hand, most home health agencies have relatively little close interaction with physicians.

Regardless of what type of organizations are allowed to provide case management services, HCFA should require that the services meet certain specifications. The experience in the current demonstration suggests that, without such structure, case management is not likely to be effective. If HCFA is paying for the services, it should try to maximize the likelihood that case management will generate the savings in medical costs required to offset the case management costs. HCFA could limit the agencies with which they contract to only certain ones in each market area, creating "centers of excellence" for postacute care for each of several high risk conditions. Whether this would lead physicians to refer their patients to such organizations is an open question, however, since many physicians believe they need no help in treating patients with chronic conditions.

In addition to being less risky for case management providers, this approach has a few potential financial advantages over the other two methods. Since organizations would be paid for the case management, there is less incentive for cream skinning to occur than under capitation. In addition, if large savings are generated, HCFA's share could be greater than what it would receive under a capitation arrangement.

The major disadvantage of paying directly for case management is that total costs to HCFA might well increase. If case management fails to reduce Medicare costs or reduces them by an amount less than the cost of the case management, net costs to HCFA will increase under this option. HCFA bears most of the financial risk under this option.

A second disadvantage is that many of the beneficiaries in the target groups of interest are likely to be receiving home health care (30 to 60 percent of control group members in these three projects were), and the responsibilities of home health care overlap substantially with those of a case manager. Patient

education and monitoring are two of the primary functions of home health nurses. Thus, for a sizable fraction of the beneficiaries, HCFA already is paying for some of the services that presumably would be provided under case management. However, Medicare home health care is limited to beneficiaries who are homebound and need some skilled nursing. Beneficiaries with chronic illness may need long-term education or ongoing monitoring. Case management payments, presumably, would have to be restricted to beneficiaries who meet the diagnosis and severity criteria and either do not qualify for conventional home health care (for example, are not homebound) or have been discharged from home health. The length of home health episodes varies widely across the country, however, so there is clearly some discretion about continued eligibility for home health, which could be abused. Ways around such adverse incentives are possible and clearly would be necessary.

A third potential problem with paying for case management on a fee-for-service basis is that physician's care and the case manager's activities may not be as integrated as they would be if case management were not a separate service. However, this would seem to be a surmountable problem. For example, some home health agencies are owned by and co-located with hospitals, which employ some physicians and grant others admitting privileges. It might also be possible to divide rewards for cost savings in some way between beneficiaries' physicians and the case management provider, to foster a closer relationship.

4. Mechanics of Rate Setting

The mechanics of setting payment rates involves making decisions on a number of additional program features. Among the decisions to be made are:

- The starting point and length of either the at-risk period (for bundled capitation) or the period of coverage (for a direct payment approach)
- The geographic area over which the capitation or payment rate for a case management provider should be calculated

- Whether the capitation rate or bonus should be based on both Part A and Part B services, or just Part A, given the expectation that cost savings will result primarily from reductions in hospital readmissions
- The percentage of projected average costs at which to set the capitation rate (or the proportion of savings, and possibly costs, that should accrue to HCFA under a bonus arrangement)
- The method of adjusting capitation rates or bonus calculations for case mix severity
- The method of setting the amount to be paid for case management (under a fee schedule reimbursement system)

Under any payment approach, quality assurance procedures also would be needed. HCFA must be able to ensure that Medicare beneficiaries receive appropriate care, regardless of the payment mechanism. Because capitation and (to a lesser extent) bonus payment methods encourage cost cutting, it will be important to ensure that the quality of care is not compromised.

5. Integrating Physicians into Case Management

The experience of these three demonstrations suggests that HCFA should only contract with case management providers who already integrate physicians in the case management process. To achieve the physician/case manager integration that we believe is necessary for case managers to have credibility with beneficiaries, physicians must consider case managers part of a team. If the education the case manager provides to the beneficiary is not completely consistent with information the physician provides, beneficiaries will be confused and less likely to adhere to prescribed regimens. Furthermore, Medicare beneficiaries are accustomed to taking medical instruction and advice only from physicians or from nurses in hospitals, physicians' offices, or home health agencies. Thus, both physicians and case managers should make it clear to beneficiaries that the case manager is acting on behalf of the beneficiary's physician.

Integrating the activities of case managers and physicians in caring for the beneficiary could also help in dealing efficiently with the rapid changes that often occur in people with chronic illnesses. Case managers can provide physicians with more recent information on the beneficiary's symptoms, behavior,

and home environment than would otherwise be available. This information may enable the physician to respond rapidly to sudden changes in the beneficiary's condition without admitting the beneficiary to the hospital. The monitoring by the case manager could also enable the physician to learn more quickly about a need to change a treatment regimen. Case managers can then help remind the beneficiary that the regimen has changed, until it becomes fully incorporated in the beneficiary's daily routine.

Some of the most knowledgeable case management providers may be independent organizations whose sole focus is patient education and monitoring for specific diseases. However, unless the physicians view the case managers as part of the care team and treat them as such throughout the course of the beneficiary's illness, there is little likelihood that hospital admissions will decline noticeably. The critical requirement in considering such firms should be clearly demonstrated awareness of the importance of this link and proven ability to work with physicians in a fee-for-service setting. Consortiums of hospitals or physicians with independent case management providers may be particularly attractive arrangements, provided that the physicians are willing and active participants in the agreement.

E. WHERE DO WE GO FROM HERE?

Given the lack of impacts from the current demonstration projects, more carefully designed case management projects must be defined, pilot tested, and evaluated before such a project can be considered for fee-for-service Medicare. Conducting a demonstration for one or two particular conditions in several sites to see if the impacts similar to those found by Rich et al. (1995) and Wasson et al. (1996) can be replicated would also provide a test of the design features to be worked out. If these demonstration projects are successful, it should be possible to proceed fairly quickly to implement a national case management program for these conditions. Expanding case management to other conditions could be examined in other demonstrations, either concurrently with this demonstration or afterward.

Despite the experience of these three demonstration projects, the widespread use of case management by HMOs and the experience reported in a few studies suggest that *carefully designed* case management

interventions for certain high-cost conditions might save money for HCFA on fee-for-service Medicare. The challenge will be for providers to design such interventions that do not cost more than the medical cost savings. If this can be accomplished, HCFA may reduce costs in the most desirable way--by enhancing the ability of some of the highest-cost beneficiaries to practice effective self-care, thereby reducing their need for resource-intensive care.

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APPENDIX A
COMPANION TABLES FOR
CHAPTER II

TABLE A.1
FACTORS ASSOCIATED WITH THE DECISION TO PARTICIPATE
IN CASE MANAGEMENT AMONG ELIGIBLE BENEFICIARIES
(Probit Coefficients)^a

	AdminaStar	IFMC	Providence Hospital
Medicare Service Use and Reimbursement During Predemonstration Year			
Number of Inpatient Hospital Days	-0.00	0.00	-0.00
Whether Any Inpatient Admissions Starting with Emergency Room Visit	0.03	0.04	-0.06
Whether Any Skilled Nursing Facility Care	-0.35***	-0.02	-0.13
Whether Any Home Health Care	0.02	-0.04	0.14*
Whether Any Outpatient Emergency Room Visits	-0.09**	0.04	-0.07
Total Part A Reimbursement ÷ 1,000	-0.00	-0.00	-0.01
Total Part B Reimbursement ÷ 1,000	0.03***	0.00	0.01
Medicare Eligibility Data			
Age Less Than 65 (IFMC Only)	NA	0.03	NA
Age 85 or Older	-0.43***	-0.20***	-0.17*
Died During Six Months Following Participation Decision	-0.23***	-0.19***	-0.31**
Male	0.08*	0.02	-0.06
Nonwhite	0.22***	-0.06	0.27***
Has Medicaid Buy-In for Medicare A or B	-0.26***	0.13	-0.47**
Disability Is Original Reason for Medicare Eligibility	0.05	-0.06	0.22*
Whether Participation Decision During First Six Project Months (or First AdminaStar Cohort)			
	-0.08	0.25	-0.04
Project-Specific Measures			
Seminal Hospitalization Within Six Months of Consent	-0.06	NA	NA
Any Hospitalization Within Two Months of Consent	-0.12**	NA	NA
Target Diagnosis Chronic Obstructive Pulmonary Disease	NA	0.00	NA
Referral Source Claims (Rather than Hospital)	NA	-0.09	NA
Community Referral	NA	NA	1.94***
Proportion Participating (Mean of Dependent Variable)			
	0.19	0.32	0.26
Number of Observations	5,753	2,308	1,589

TABLE A.1 (continued)

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996; 1992 through 1995 National Claims History files; AdminaStar's Patients Assisted to Healthy Hearts (PATH) database; IFMC's Catastrophic Case Management (CCM) database; Providence Hospital's Geriatric Case Management (GCM) database.

NOTE: Probits run separately for each project. Dependent variable was "whether consented to participate." Study group included all beneficiaries eligible for the IFMC and Providence Hospital projects and all potentially eligible beneficiaries for the AdminaStar project other than those who died before random assignment.

NA = control variable not available for that project

*Probit coefficients do not indicate the magnitude of the effect of the characteristics on the probability of participation. An approximate estimate of the effect of a one-unit increase in a given independent variable on the probability of participation can be obtained by multiplying the coefficient on that variable by about .30 for AdminaStar and about .35 for the other two projects. Thus, those age 85 or older were about 13 percentage points ($.43 \times .30$) less likely to participate in AdminaStar than an otherwise identical beneficiary who was between 65 and 85.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.2

MEDICARE ELIGIBILITY CHARACTERISTICS OF TREATMENT AND CONTROL GROUP MEMBERS AT ENROLLMENT IN THE ADMINASTAR PROJECT
(Percentages Unless Otherwise Noted)

	Clients	Control Group Members
Age at Random Assignment**		
Younger than 65	0.0	0.0
65 to 74	40.5	43.0
75 to 84	44.1	44.4
85 to 89	13.1	8.6
90 or older	2.3	4.0
Mean age (years)	77.2	77.0
Sex		
Male	42.1	44.1
Female	57.9	55.9
Race		
White	91.6	92.5
Black	7.6	7.4
Other race/race not available	0.9	0.2
Medicaid Buy-In for Medicare A or B	10.1	8.8
Original Reason for Medicare Eligibility		
Old age	88.0	86.7
Disability	12.1	13.3
End-stage renal disease	0.0	0.0
Number of Observations*	556	556

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996.

NOTE: Statistical comparisons are of nonregression-adjusted treatment and control group means using chi-squared and Student's t-tests.

*Excludes 11 randomized beneficiaries with no Medicare-covered hospitalization on the claims files and 11 randomized beneficiaries who died prior to random assignment.

**Significantly different from zero at the .10 level, two-tailed test.

***Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.3

MEDICARE ELIGIBILITY CHARACTERISTICS OF TREATMENT AND CONTROL GROUP
MEMBERS AT ENROLLMENT IN THE IFMC PROJECT
(Percentages Unless Otherwise Noted)

	Clients	Control Group Members
Age at Random Assignment		
Younger than 65	5.1	8.0
65 to 74	35.1	36.9
75 to 84	42.6	38.8
85 to 89	11.2	10.5
90 or older	6.1	5.8
Mean age (years)	77.0	76.1
Sex		
Male	46.0	44.9
Female	54.0	55.1
Race		
White	95.2	97.5
Black	3.7	1.9
Other race/race not available	1.1	0.6
Medicaid Buy-In for Medicare A or B	13.3	12.7
Original Reason for Medicare Eligibility		
Old age	83.2	83.5
Disability	16.5	16.3
End-stage renal disease	0.3	0.3
Number of Observations^a	376	363

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996.

NOTE: Statistical comparisons are of nonregression-adjusted treatment and control group means using chi-squared and Student's t-tests.

^aExcludes 40 randomized beneficiaries with no match to Medicare eligibility files (most of whom were railroad retirees), 25 randomized beneficiaries with no Medicare-covered hospitalization on the claims files, and 3 randomized beneficiaries who died prior to random assignment.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.4

MEDICARE ELIGIBILITY CHARACTERISTICS OF TREATMENT AND CONTROL GROUP MEMBERS AT ENROLLMENT IN THE PROVIDENCE HOSPITAL PROJECT
(Percentages Unless Otherwise Noted)

	Clients	Control Group Members
Age at Random Assignment**		
Younger than 65	0.0	0.0
65 to 74	45.5	42.7
75 to 84	36.4	41.7
85 to 89	12.9	10.4
90 or older	5.3	5.2
Mean age (years)	77.2	77.5
Sex		
Male	38.8	38.9
Female	61.2	61.1
Race		
White	74.2	75.4
Black	25.4	24.2
Other race/race not available	0.5	0.5
Medicaid Buy-In for Medicare A or B	3.8	2.8
Original Reason for Medicare Eligibility		
Old age	86.6	87.2
Disability	13.4	12.8
End-stage renal disease	0.0	0.0
Number of Observations*	209	211

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996.

NOTE: Statistical comparisons are of nonregression-adjusted treatment and control group means using chi-squared and Student's t-tests.

*Excludes 10 randomized beneficiaries with no match to Medicare eligibility files (most of whom were railroad retirees) and 12 randomized beneficiaries with no Medicare-covered hospitalization on the claims files.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.5

MEDICARE SERVICE USE AND REIMBURSEMENT FOR TREATMENT AND CONTROL
GROUP MEMBERS DURING THE YEAR PRIOR TO THE START OF THE
DEMONSTRATION FOR THE ADMINASTAR PROJECT

	Clients	Control Group Members
Inpatient Hospital (Part A)		
Percentage Receiving Care	89.4	89.7
Mean Number of Days for Users	13.4	14.3
Mean Number of Admissions for Users	1.9	1.9
Mean Reimbursement for Care (Dollars)	8,117	9,069
Skilled Nursing Facility (Part A)		
Percentage Receiving Care	6.7	6.7
Mean Number of Days for Users	27.2	36.9
Mean Reimbursement for Care (Dollars)	4,228	5,254
Home Health (Part A)		
Percentage Receiving Care	29.0	30.6
Mean Number of Visits for Users	69.3**	48.4
Mean Reimbursement for Care (Dollars)	3,788**	2,688
Inpatient Emergency Room (ER) (Part A)		
Percentage with Inpatient Admissions that Included an ER Visit	63.4	63.8
Outpatient Hospital (Part B)		
Percentage Receiving Care	86.2	85.4
Percentage with ER Visit	32.0	32.6
Mean Reimbursement for Care (ER and non-ER) (Dollars)	675	820

TABLE A.5 (continued)

	Clients	Control Group Members
Physician and Other Part B Services		
Percentage Receiving Care	99.8	99.5
Mean Reimbursement for Care (Dollars)	1,995	2,237
Mean Reimbursement (Dollars)		
Part A	8,634	9,311
Part B	2,574	2,925
Total Parts A and B	11,207	12,236
Median Reimbursement (Dollars)		
Part A	4,849	4,749
Part B	1,855	1,772
Total Parts A and B	7,169	7,104
Number of Observations*	556	556

SOURCE: 1992 through 1995 National Claims History files.

NOTE: The period of observation for AdminaStar is the year before December 17, 1993, for the first wave of identified beneficiaries and is the year before April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.)

Statistical comparisons are of nonregression-adjusted treatment and control group means using Student's t-tests.

*Excludes 11 randomized beneficiaries with no Medicare-covered hospitalization on the claims files and 11 randomized beneficiaries who died prior to random assignment.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.6

MEDICARE SERVICE USE AND REIMBURSEMENT FOR TREATMENT AND CONTROL
GROUP MEMBERS DURING THE YEAR PRIOR TO THE START OF THE
DEMONSTRATION FOR THE IFMC PROJECT

	Clients	Control Group Members
Inpatient Hospital (Part A)		
Percentage Receiving Care	99.7	100.0
Mean Number of Days for Users	18.3	18.1
Mean Number of Admissions for Users	2.1	2.1
Mean Reimbursement for Care (Dollars)	10,341	10,164
Skilled Nursing Facility (Part A)		
Percentage Receiving Care	10.9	13.5
Mean Number of Days for Users	16.5	16.5
Mean Reimbursement for Care (Dollars)	3,046	2,705
Home Health (Part A)		
Percentage Receiving Care	27.1	28.9
Mean Number of Visits for Users	33.6	43.1
Mean Reimbursement for Care (Dollars)	2,022	2,556
Inpatient Emergency Room (ER) (Part A)		
Percentage with Inpatient Admissions that Included an ER Visit	70.7	68.3
Outpatient Hospital (Part B)		
Percentage Receiving Care	84.3	81.3
Percentage with ER Visit	38.8	33.3
Mean Reimbursement for Care (ER and non-ER) (Dollars)	669**	973

TABLE A.6 (continued)

	Clients	Control Group Members
Physician and Other Part B Services		
Percentage Receiving Care	99.7	99.7
Mean Reimbursement for Care (Dollars)	3,291	3,302
Mean Reimbursement (Dollars)		
Part A	11,194	11,268
Part B	3,846	4,083
Total Parts A and B	15,040	15,352
Median Reimbursement (Dollars)		
Part A	6,811	7,567
Part B	3,044	3,207
Total Parts A and B	10,223	11,409
Number of observations*	376	363

SOURCE: 1992 through 1995 National Claims History files.

NOTE: The period of observation is the year before the date of random assignment if the beneficiary was randomized after hospital discharge, but the year before the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project.

Statistical comparisons are of nonregression-adjusted treatment and control group means using Student's t-tests.

*Excludes 40 randomized beneficiaries with no match to Medicare eligibility files (most of whom were railroad retirees), 25 randomized beneficiaries with no Medicare-covered hospitalization on the claims files, and 3 randomized beneficiaries who died prior to random assignment.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.7

MEDICARE SERVICE USE AND REIMBURSEMENT FOR TREATMENT AND CONTROL
GROUP MEMBERS DURING THE YEAR PRIOR TO THE START OF THE
DEMONSTRATION FOR THE PROVIDENCE HOSPITAL PROJECT

	Clients	Control Group Members
Inpatient Hospital (Part A)		
Percentage Receiving Care	91.9	92.4
Mean Number of Days for Users	15.6	13.9
Mean Number of Admissions for Users	1.9	1.7
Mean Reimbursement for Care (Dollars)	11,617	10,909
Skilled Nursing Facility (Part A)		
Percentage Receiving Care	8.1	6.6
Mean Number of Days for Users	25.1**	6.2
Mean Reimbursement for Care (Dollars)	2,811**	949
Home Health (Part A)		
Percentage Receiving Care	42.1**	32.2
Mean Number of Visits for Users	38.4	39.3
Mean Reimbursement for Care (Dollars)	3,021	3,243
Inpatient Emergency Room (ER) (Part A)		
Percentage with Inpatient Admissions that Included an ER Visit	65.1	67.8
Outpatient Hospital (Part B)		
Percentage Receiving Care	80.9	71.6
Percentage with ER Visit	34.0	26.5
Mean Reimbursement for Care (ER and non-ER) (Dollars)	1,301	1,226

TABLE A.7 (continued)

	Clients	Control Group Members
Physician and Other Part B Services		
Percentage Receiving Care	99.5	99.5
Mean Reimbursement for Care (Dollars)	3,619	3,480
Mean Reimbursement (Dollars)		
Part A	12,173	11,190
Part B	4,653	4,341
Total Parts A and B	16,826	15,531
Median Reimbursement (Dollars)		
Part A	9,082	7,487
Part B	3,543	3,208
Total Parts A and B	13,657	11,560
Number of Observations*	209	211

SOURCE: 1992 through 1995 National Claims History files.

NOTE: The period of observation is the year before the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the year before the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between December 1993 and May 1995 for the Providence Hospital project.

Statistical comparisons are of nonregression-adjusted treatment and control group means using Student's t-tests.

*Excludes 10 randomized beneficiaries with no match to Medicare eligibility files (most of whom were railroad retirees) and 12 randomized beneficiaries with no Medicare-covered hospitalization on the claims files.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.8

CHARACTERISTICS OF TREATMENT AND CONTROL GROUP MEMBERS AT ENROLLMENT
FOR THE ADMINASTAR PROJECT
(Percentages)

	Clients	Control Group Members
Living Arrangement		
Private home with caregiver	63.4	63.4
Private home alone	33.6	34.3
Residential home	3.0	2.3
Prescribed Diet		
Low sodium	42.0	36.9
Low sodium/low fat	19.5	21.0
Low sodium/diabetic	23.5	26.1
Other types of diets	15.0	16.0
Congestive Heart Failure Etiology ^a		
Ischemic	40.5	39.1
Hypertensive	26.2	26.1
Idiopathic	20.7	17.9
Valvular	7.6	10.1
Other	5.0	6.8
Comorbid Conditions		
Chronic Obstructive Pulmonary Disease	8.7	11.0
Diabetes	32.9	30.4
Hypertension	33.1	30.2
Other	46.9	50.4
Number of Comorbid Conditions		
None	18.1	20.1
One	38.1	34.5
Two	29.9	30.9
Three	10.4	10.0
Four to six	3.5	4.6
Number of Observations^b	568	566

SOURCE: AdminaStar's Patients Assisted to Healthy Hearts (PATH) database.

NOTE: Statistical comparisons are of nonregression-adjusted treatment and control group means using chi-squared and Student's t-tests.

TABLE A.8 (continued)

^aCHF etiology is underlying cause of CHF as reported by the beneficiary. Ischemic refers to a local and temporary deficiency in blood supply; hypertensive to high blood pressure; idiopathic to having no recognizable cause; and valvular to a faulty heart valve.

^bData were missing for six treatment and control group members.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.9

CHARACTERISTICS OF TREATMENT AND CONTROL GROUP MEMBERS AT
ENROLLMENT FOR THE IFMC PROGRAM
(Percentages)

	Clients	Control Group Members
Target Diagnosis		
Congestive Heart Failure	70.0	70.5
Chronic Obstructive Pulmonary Disease	30.1	29.5
Referral Source		
Hospitals	88.9	86.0
Claims	11.1	14.0
Referring Hospital		
Council Bluffs		
Jennie Edmundson	6.7	7.3
Mercy Hospital	8.1	7.3
Des Moines		
Iowa Lutheran	7.9	6.8
Iowa Methodist	7.9	8.8
Mercy Medical Center	37.2	38.8
Lincoln		
Bryan	13.6	13.0
St. Elizabeth	2.5	1.3
Omaha		
Immanuel	8.1	9.3
Bishop Clarkson	4.4	4.4
Red Oak		
Montgomery County	3.7	3.0
Informal Caregiver		
Spouse	34.7***	31.0
Daughter	25.1	19.8
Son	16.0	13.8
Other relative or nonrelative	14.3	15.0
No caregiver/blank/missing*	9.9	20.5
Number of Observations	406	400

TABLE A.9 (continued)

SOURCE: IFMC's Catastrophic Case Management (CCM) database.

NOTE: Statistical comparisons are of nonregression-adjusted treatment and control group means using chi-squared and Student's t-tests.

*Although information about primary informal caregivers was collected prior to random assignment, this information was updated by the project for treatment group members during the intervention. Thus, the data are not comparable for treatment and control group members.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE A.10

CHARACTERISTICS OF TREATMENT AND CONTROL GROUP MEMBERS
AT ENROLLMENT FOR THE PROVIDENCE HOSPITAL PROGRAM
(Percentages Unless Otherwise Noted)

	Clients	Control Group Members
Target Diagnosis		
Congestive Heart Failure	11.3	12.7
Chronic Obstructive Pulmonary Disease	6.8	5.9
Stroke	13.1	14.1
Pneumonia/sepsis	14.5	14.1
Joint replacement	13.1	12.3
Nutritional/metabolic	4.1	7.7
Ischemic heart disease	22.6	18.2
Community or nursing home referral	14.5	15.0
Living Arrangement		
Private home	95.0	96.3
Assisted living	2.7	2.8
Nursing home	2.3	0.9
Household Size		
One person	32.9	32.2
Two people	51.6	51.9
Three or more people	15.5	15.9
Primary Informal Caregiver		
Spouse	41.2	39.6
Daughter	19.9	20.0
Son	8.1	10.9
Other or unknown relative or nonrelative	18.1	18.2
Self/blank	12.7	11.4
Ability to Perform Personal Care Activities (ADL Scale Score)*		
Needs most assistance (0 to 10)	25.3	22.7
Needs some assistance (11 to 13)	28.1	31.4
Needs no assistance (14)	46.6	45.9
Mean ADL score	11.7	12.0

TABLE A.10 (continued)

	Clients	Control Group Members
Ability to Perform Routine Chores (IADL Scale Score)^a		
Needs most assistance (0 to 6)	22.2	18.6
Needs some assistance (7 to 13)	64.3	64.6
Needs no assistance (14)	13.6	16.8
Mean IADL score	9.2	9.7
Depression (Geriatric Depression Scale [GDS])^c		
Not depressed (0 to 5)	73.1	78.2
Depressed (6 to 15)	26.9	21.8
Mean GDS Score	3.8	3.4
Mental Functioning (Short Portable Mental Status Questionnaire [SPMSQ])^d		
Intact mental functioning (0 to 2)	75.1	74.9
Mild impairment (3 to 4)	14.8	12.1
Moderate impairment (5 to 7)	6.7	7.4
Severe impairment (8 to 10)	3.4	5.6
Mean SPMSQ score	1.7	1.8
Morale (Philadelphia Geriatric Center Morale Scale [PGCMS])^e		
Low morale (0 to 9)	30.6	24.5
Moderate morale (10 to 12)	26.4	24.5
High morale (13 to 17)	43.0	51.0
Mean PGCMS score	11.4	11.9
Number of Observations^f	221	221

SOURCE: Providence Hospital's Geriatric Case Management (GCM) database

NOTE: Statistical comparisons are of nonregression-adjusted treatment and control group means using chi-squared and Student's t-tests.

^aADLs include bathing, dressing, grooming, toileting, transfer from bed, ambulation, and eating. Each task is scored "2" if task can be performed without help, "1" if some help required, and "0" if totally dependent.

^bIADLs include using the telephone, traveling, shopping, meal preparation, housework, managing medications, and handling money. Task are scored the same as ADLs.

TABLE A.10 (continued)

^eThe GDS includes questions about life satisfaction, control over life events, and level of optimism. Data were missing for a few enrollees who were not able to be tested (for example, because they could not speak or were confused). Responses reflecting depression all scored "1." Others are scored "0."

^dSPMSQ asks the day of the week, the date, the place in which the questions are being asked, the respondent's name, telephone number, age, date of birth, mother's maiden name, the current and last U.S. presidents, and a simple arithmetic problem. Incorrect responses are scored "1," correct responses "0."

^ePGCMS examines how easily the respondent becomes agitated, the respondent's attitude toward aging, and life satisfaction. Responses reflecting high morale are scored "1." Those reflecting low morale are scored "0."

^fNone of the data presented in this table were available for one control group member whose record was overwritten in the project database. In addition, data were missing for between 5 and 48 respondents for living arrangement, household size, the depression scale, the mental functioning scale, and the morale scale.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

APPENDIX B

**COMPANION TABLES FOR CHAPTER III
AND CARE REVIEW FORMS**

TABLE B.1

ADMINASTAR CLIENT CHARACTERISTICS AT INITIAL ASSESSMENT
(Percentages)

Informal Caregiver Support	
Good	78.0
Fair or Poor	22.0
 Activities of Daily Living (ADLs)	
Needs No Assistance	70.4
Performs with Assistance	26.4
Dependent for ADLs	3.2
 New York Cardiac Classification (Limitations to Physical Activity)	
No Limit	16.1
Slight Limit	48.9
Marked Limit	31.3
Unable to Perform Without Discomfort	3.7
 Ambulation	
Ambulatory	82.9
Needs Assistance to Ambulate	11.7
Confined to Home or Facility	5.5
 Transportation	
Drives Own Car	50.7
Caregiver Drives	46.3
Uses Public Transportation	3.0
 Mental Status	
Good	88.7
Fair or Poor	11.3

TABLE B.1 (continued)

Awakened at Night by Shortness of Breath	
Never or Not Presently	78.3
Sometimes	18.8
Always	2.9
Shortness of Breath on Exertion (Dyspnea)	
When Walking More than Two Blocks	32.4
When Walking One Block	28.4
When Walking to Car	7.6
When Walking in Home	25.1
When Walking in Room	6.6
Swelling in Extremities	
Never or Not Presently	63.7
Sometimes	21.9
Daily	14.4
Tobacco and Alcohol Consumption	
Smokes Tobacco	6.4
Drinks Alcohol	16.2
Number of Observations*	531

SOURCE: AdminaStar's Patients Assisted to Healthy Hearts (PATH) database.

*Data were missing for 16 clients for New York Cardiac Classification, Awakened at Night by Shortness of Breath, Shortness of Breath on Exertion, and Swelling in Extremities.

TABLE B.2
IFMC CLIENT CHARACTERISTICS AT INITIAL ASSESSMENT
(Percentages)

Needs Assistance with Activities	
Shopping	33.0
Traveling Beyond Walking Distance	29.9
Paying Bills	18.3
Taking Medications	18.6
Preparing Meals	18.6
Dressing, Washing, or Toileting	12.4
Using the Telephone	10.1
 Number of Activities for Which Help Needed	
Needs No Help	61.4
Needs Help with One or Two Activities	14.4
Needs Help with Three or More Activities	24.2
 Mental Functioning (4-Question Scale)	
All Correct	89.9
One or Two Wrong	5.6
Three or Four Wrong	4.5
 Marital Status	
Married	46.5
Widowed	39.5
Divorced/Separated	12.6
Never Married	1.4
Number of Observations*	357

SOURCE: IFMC's Catastrophic Case Management (CCM) database.

*Of the 406 clients enrolled in the IFMC project, 49 were missing the data from the Functional Assessment Screen Evaluation assessment that appear in this table. Among those, 20 were inadvertently assessed only with the longer KanSAS instrument, 20 died or disenrolled before they could be assessed, and 9 were missing these data for other reasons. In addition, data were missing for 2 clients for Needs Assistance with Activities and Number of Activities for Which Help Needed.

TABLE B.3

DEMOGRAPHIC CHARACTERISTICS OF AND MEDICARE SERVICE USE AND
REIMBURSEMENT FOR CLIENTS WHO COMPLETED AND DISENROLLED
FROM THE ADMINASTAR PROJECT

	Completers	Disenrollees
Demographic Characteristics (Percentages)		
Age 85 or Older	12.9*	21.4
Male	36.0	41.8
Nonwhite	10.0	10.2
Has Medicaid Buy-In for Medicare A or B	10.0*	18.4
Original Reason for Medicare Was Disability	11.9	14.3
Any Use of Medicare Services During First Six Months After Random Assignment (Percentages)		
Inpatient	24.4***	48.0
Skilled Nursing Facility	2.6**	10.2
Home Health	17.0*	26.5
Inpatient Admission Starting with Emergency Room Visit	17.3***	36.7
Outpatient	67.5	71.4
Outpatient ER Visit	19.6	19.4
Physician or Other Part B	94.9	94.9
Medicare Reimbursement During First Six Months After Random Assignment (Dollars)		
Part A	2,000**	6,218
Part B	1,028**	1,535
Total Parts A and B	3,028**	7,754
Number of Observations^a	311	98

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996; 1993 through 1995 National Claims History files.

NOTE: The Medicare service use and reimbursement period of observation for AdminaStar is the six months after December 17, 1993, for the first wave of identified beneficiaries and is the six months after April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.)

TABLE B.3 (continued)

*Excludes 12 clients with no match to Medicare eligibility files, with no Medicare-covered hospitalization on claims files, or who died prior to random assignment. This table also excludes clients who died during the intervention period.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE B.4

**DEMOGRAPHIC CHARACTERISTICS OF AND MEDICARE SERVICE USE AND
REIMBURSEMENT FOR CLIENTS WHO COMPLETED AND DISENROLLED
FROM THE IFMC PROJECT**

	Completers	Disenrollees
Demographic Characteristics (Percentages)		
Age 85 or Older	18.0	12.5
Male	46.1	62.5
Nonwhite	3.7	0.0
Has Medicaid Buy-In for Medicare A or B	15.7	0.0
Original Reason for Medicare Was Disability	15.7	37.5
Any Use of Medicare Services During First Six Months After Random Assignment (Percentages)		
Inpatient	40.8	62.5
Skilled Nursing Facility	10.9	0.0
Home Health	38.2	37.5
Inpatient Admission Starting with Emergency Room Visit	27.0	50.0
Outpatient	77.9	62.5
Outpatient ER Visit	19.5	37.5
Physician or Other Part B	98.5	87.5
Medicare Reimbursement During First Six Months After Random Assignment (Dollars)		
Part A	5,111	7,941
Part B	2,406***	784
Total Parts A and B	7,517	8,725
Number of Observations*	267	8

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996; 1993 through 1995 National Claims History files.

NOTE: The period of observation for clients in the IFMC project is the six months after the date of random assignment if the client was randomized after hospital discharge, but the six months after the day after hospital discharge if the client was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project.

TABLE B.4 (continued)

^aExcludes 30 clients with no match to Medicare eligibility files, with no Medicare-covered hospitalization on claims files, or who died prior to random assignment. This table also excludes clients who died during the intervention period.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

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TABLE B.5

**DEMOGRAPHIC CHARACTERISTICS OF AND MEDICARE SERVICE USE AND
REIMBURSEMENT FOR CLIENTS WHO COMPLETED AND DISENROLLED
FROM THE PROVIDENCE HOSPITAL PROJECT**

	Completers	Disenrollees
Demographic Characteristics (Percentages)		
Age 85 or Older	17.2	13.3
Male	38.0	46.7
Nonwhite	25.8	26.7
Has Medicaid Buy-In for Medicare A or B	3.1	13.3
Original Reason for Medicare Was Disability	12.3	26.7
Any Use of Medicare Services During First Six Months After Random Assignment (Percentages)		
Inpatient	39.3**	73.3
Skilled Nursing Facility	9.8	20.0
Home Health	53.4	73.3
Inpatient Admission Starting with Emergency Room Visit	23.9*	46.7
Outpatient	70.6	86.7
Outpatient ER Visit	25.8	33.3
Physician or Other Part B	98.8	100.0
Medicare Reimbursement During First Six Months After Random Assignment (Dollars)		
Part A	6,852**	18,255
Part B	2,498**	5,706
Total Parts A and B	9,351**	23,961
Number of Observations*	163	15

SOURCE: Medicare Health Insurance Skeleton Eligibility Write-Off (HISKEW) file accessed in May 1996; 1993 through 1995 National Claims History files.

NOTE: The period of observation for clients in the Providence Hospital project is the six months after the date of random assignment if the client was randomized after hospital discharge (or was a Providence Hospital community referral), but the six months after the day after hospital discharge if the client was randomized while in the hospital. Random assignment took place between December 1993 and May 1995 for the Providence Hospital project.

TABLE B.5 (continued)

*Excludes 12 clients with no match to Medicare eligibility files, with no Medicare-covered hospitalization on claims files (unless they were community referrals), or who died prior to random assignment. This table also excludes clients who died during the intervention period.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE B.6

CHARACTERISTICS AT INITIAL ASSESSMENT FOR ADMINASTAR CLIENTS
WHO COMPLETED AND DISENROLLED FROM THE PROJECT
(Percentages)

	Completers	Disenrollees
Informal Caregiver Support		
Good	75.2	77.2
Fair or Poor	24.8	22.8
Activities of Daily Living (ADLs)	***	
Needs No Assistance	79.6	58.2
Performs with Assistance	17.8	39.2
Dependent for ADLs	2.6	2.5
New York Cardiac Classification (Limitations to Physical Activity)	***	
No Limit	22.6	5.4
Slight Limit	51.3	47.3
Marked Limit	24.2	40.5
Unable to Perform Without Discomfort	1.9	6.8
Ambulation		
Ambulatory	87.6	73.4
Needs Assistance to Ambulate	8.9	19.0
Confined to Home or Facility	3.5	7.6
Transportation		
Drives Own Car	52.9	44.3
Caregiver Drives	44.9	53.2
Uses Public Transportation	2.2	2.5
Mental Status		
Good	91.1	87.3
Fair or Poor	8.9	12.7
Awakened at Night by Shortness of Breath	***	
Never or Not Presently	84.4	75.7
Sometimes	14.3	20.3
Always	1.3	4.1

TABLE B.6 (continued)

	Completers	Disenrollees
Shortness of Breath on Exertion (Dyspnea)		
When Walking More Than Two Blocks	40.5	21.6
When Walking One Block	28.3	28.4
When Walking to Car	6.4	5.4
When Walking in Home	19.8	35.1
When Walking in Room	5.1	9.5
Swelling in Extremities		
Never or Not Presently	66.2	59.5
Sometimes	21.7	20.3
Daily	12.1	20.3
Tobacco and Alcohol Consumptions		
Smokes Tobacco	6.1	8.9
Drinks Alcohol	16.9	13.9
Enrollment Cohort	**	
December 1993	73.9	63.6
April 1994	26.1	36.4
Comorbid Conditions		
Chronic Obstructive Pulmonary Disease	7.3*	13.3
Diabetes	34.4	38.8
Hypertension	35.7	28.6
Case Management Level	**	
Minimal	33.4	18.2
Moderate	47.8	58.4
Intense	18.8	23.4
Number of Observations^a	314	99

SOURCE: AdminaStar's Patients Assisted to Healthy Hearts (PATH) database.

^aData were missing for between 1 and 25 disenrollees for each of the measures except Enrollment Cohort.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE B.7

CHARACTERISTICS AT INITIAL ASSESSMENT FOR IFMC CLIENTS
WHO COMPLETED AND DISENROLLED FROM THE PROJECT
(Percentages)

	Completers	Disenrollees
Target Diagnosis		
Congestive Heart Failure	67.6	66.7
Chronic Obstructive Pulmonary Disease	32.4	33.3
Referral Source		
Hospital Staff	86.9	100.0
Hospital Claims	13.1	0.0
Enrollment Cohort		
October 1993 to March 1994	27.6	33.3
April 1994 to September 1994	35.2	55.6
October 1994 to March 1995	37.2	11.1
Number of Activities for Which Help Needed		
Needs No Help	67.5	50.0
Needs Help with One or Two Activities	13.1	25.0
Needs Help with Three or More Activities	19.4	25.0
Mental Functioning (4-Question Scale)		
All Correct	93.0	100.0
One or Two Wrong	5.2	0.0
Three or Four Wrong	1.9	0.0
Marital Status		
Married	48.5	25.0
Widowed	36.7	50.0
Divorced/Separated	13.7	25.0
Never Married	1.1	0.0
Number of Observations^a	290	9

SOURCE: IFMC's Catastrophic Case Management (CCM) database.

TABLE B.7 (continued)

*Data were missing for 20 completers (188 of whom were not assessed with the Functional Assessment Screen Evaluation [FASE] instrument) and 5 disenrollees (all 5 of whom were not assessed with the FASE) for Number of Activities for Which Help Needed, Mental Functioning, and Marital Status.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE B.8

CHARACTERISTICS AT INITIAL ASSESSMENT FOR PROVIDENCE HOSPITAL CLIENTS
WHO COMPLETED AND DISENROLLED FROM THE PROJECT
(Percentages Unless Otherwise Noted)

	Completers	Disenrollees
Target Diagnosis		
Congestive Heart Failure	10.4	0.0
Chronic Obstructive Pulmonary Disease	6.9	0.0
Stroke	13.3	11.8
Pneumonia/sepsis	14.5	23.5
Joint replacement	13.9	29.4
Nutritional/metabolic	2.3	5.9
Ischemic heart disease	22.5	23.5
Community or nursing home referral	16.2	5.9
Living Arrangement	*	
Private home	95.9	94.1
Assisted living	3.5	0.0
Nursing home	0.6	5.9
Household Size		
One person	30.8	47.1
Two people	53.9	35.3
Three or more people	15.4	17.7
Primary Informal Caregiver		
Spouse	41.6	41.2
Daughter	20.8	11.8
Son	7.5	23.5
Other or unknown relative or nonrelative	17.9	5.9
Self/blank	12.1	17.7
Ability to Perform Personal Care Activities (ADL Scale Score) ^a		
Needs most assistance (0 to 10)	22.0	11.8
Needs some assistance (11 to 13)	28.3	35.3
Needs no assistance (14)	49.7	52.9
Mean ADL scale score	11.9	12.8

TABLE B.8 (continued)

	Completers	Disenrollees
Ability to Perform Routine Chores (IADL Scale Score)^b		
Needs most assistance (0 to 6)	20.2	17.7
Needs some assistance (7 to 13)	63.6	70.6
Needs no assistance (14)	16.2	11.8
Mean IADL scale score	9.5	10.1
Depression (Geriatric Depression Scale [GDS])^c		
Not depressed (0 to 5)	75.0	64.3
Depressed (6 to 15)	25.0	35.7
Mean GDS score	3.6	4.6
Mental Functioning (Short Portable Mental Status Questionnaire [SPMSQ])^d		
Intact mental functioning (0 to 2)	77.4	75.0
Mild impairment (3 to 4)	11.6	18.8
Moderate impairment (5 to 7)	7.3	6.3
Severe impairment (8 to 10)	3.7	0.0
Mean SPMSQ score	1.6	1.5
Morale (Philadelphia Geriatric Center Morale Scale [PGCMS])^e		
Low morale (0 to 9)	27.5	35.7
Moderate morale (10 to 12)	28.1	14.3
High morale (13 to 17)	44.4	50.0
Mean PGCMS score	11.6	11.9
Number of Observations^f	173	17

SOURCE: Providence Hospital's Geriatric Case Management (GCM) database.

^aADLs include bathing, dressing, grooming, toileting, transfer from bed, ambulation, and eating. Each task is scored "2" if task can be performed without help, "1" if some help required, and "0" if totally dependent.

^bIADLs include using the telephone, traveling, shopping, meal preparation, housework, managing medications, and handling money. Tasks are scored like the ADLs.

^cThe GDS includes questions about life satisfaction, control over life events, and level of optimism. Data were missing for a few enrollees who were not able to be tested (for example, because they could not speak or were confused). Responses reflecting depression all scored "1." Others are scored "0."

TABLE B.8 (continued)

^dThe SPMSQ asks the day of the week, the date, the place in which the questions are being asked, the respondent's name, telephone number, age, date of birth, mother's maiden name, the current and last U.S. presidents, and a simple arithmetic problem. Incorrect responses are scored "1," correct responses "0."

^eThe PGCMS examines how easily the respondent becomes agitated, the respondent's attitude toward aging, and life satisfaction. Responses reflecting high morale are scored "1." Those reflecting low morale are scored "0."

^fData were missing for between 1 and 20 completers for Living Arrangement, Household Size, Depression, Scale, Mental Functioning, or Morale and for between 1 and 3 disenrollees for Depression, Scale, Mental Functioning, or Morale.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

CARE REVIEW FORMS

Admission Data: Status of Client at Admission

Site: IA IN MI

Sample member = _____

1. Age _____ years

4. Diagnosis: CHF

COPD

2. Sex _____ F. _____ M

Stroke

3. Date of admission to demo _____

5. Severity of illness _____

6. Co-morbidities [list significant]

7. Length of time since last hospital discharge before demo admission

[estimate days] _____

for which condition: _____

CHF: New York Heart Assoc. Funct Classification System

1 = Class I - no limitations of physical activity

2 = Class II- slight limitation of physical activity: ordinary physical activity causes symptoms

3 = Class III- marked limitation of physical activity: symptoms with less than ordinary levels of activity

4 = Class IV- inability to carry on any physical activity without discomfort: symptoms present at rest

STROKE: areas of impairment: motor function of limbs (paresis or paralysis); speech/language functions; perceptual deficits; cognitive function and consciousness

1 = no paralysis, one area of impairment

2 = 2 areas of impairment

3 = 3 areas of impairment

4 = 4 areas of impairment

COPD: look for statement in record

1 = mild

2 = moderate

3 = severe

5 = unable to determine

8. Degree of functional impairment:

IA- FASE

ADL = # not indep out of ? _____

IADLs = # not indep out of 7 _____

9. Mental status:

IA: FASE- # of errors out of ? _____

IN - ADL descrip

MI 14 (Indepen) to 0 (completely dep)

ADL score _____

IADL score _____

IN - mental status descrip

MI - SPMSQ (# missed out of ten)

Generic - Response to Events

Site:			Sample member	Codes			
IA	IN	MI					
Check	if occurred		Event	1st	2nd	3rd	Response
1st	2nd	3rd		Code	Code	Code	
—	—	—	Change in client status (symptoms, functioning)	—	—	—	identified if client reported to physician identified if client needed change in service changed frequency of contact with client, if appropriate
—	—	—	Change in caregiver status	—	—	—	identified if client needed change in service
—	—	—	MD visit	—	—	—	asked for MD statement re client status identified any change in meds or treatment plan identified client need for education identified if client needed change in service
—	—	—	ER visit	—	—	—	identified if meds changed after visit identified if client needed education to prevent asked about return appointment to physician identified if client needed change in service
—	—	—	Hospital admission - while in hospital	—	—	—	contacted client in hospital shared information with hospital personnel supported caregiver participated in discharge planning
—	—	—	Hosp admission - after discharge	—	—	—	identified if meds changed after discharge asked about return appointment to physician identified if client deconditioned identified if client needed change in home care
—	—	—	NH admission	—	—	—	contacted client in NH identified if any plan for discharge supported caregiver participated in dc planning, if discharged
—	—	—	Major prob with service delivery	—	—	—	assisted with problem solving advocated with provider or changed provider
—	—	—	Termination	—	—	—	conducted reassessment provided emotional support for termination developed dc plan for services, if services referred to new provider, if nec communicated status to new provider, if new provid
Comments:							

Congestive Heart Failure Generic Care Plan

Instructions code each aspect of implementation based on the evidence in the client; record

Site IA IN MI

Codes

- 1 = occurred (adequately)- Indirectly, Directly
- 2 = occurred (inadequately, eg untimely)- I, D
- 3 = did not occur
- 6 = did not occur; needed but client refused
- 8 = not appropriate, not needed (if nec), not ordered
- 9 = unable to determine, usual source missing

Sample member _____

Code		Code	
	TEACHING		Lifestyle and health habits
—	Disease/condition:	—	lose weight, (if overweight)
—	what disease is, means	—	do not smoke or chew tobacco, (if does)
—	signs and symptoms of heart failure	—	eliminate or reduce alcohol
	[dyspnea, orthopnea, dry hacking cough, esp at night;	—	avoid coming in contact with people with colds
	fatigue, weakness; dizziness, fainting, swollen feet	—	need a flu shot yearly
	ankles; nausea with abdominal pain]	—	need a pneumonia immunization [once]
	Medications	—	wear special hose (if ordered)
—	know which medications are prescribed and what for		MONITORING:
—	instruct re compliance, take right amount regularly	—	signs and symptoms
—	know symptoms of side effects/overdose, call doctor	—	whether weighing, taking vital signs
	immediately. [nausea, vomiting, anorexia, visual	—	compliance with meds
	disturbance, cardiac arrhythmias, muscle weakness,	—	compliance with diet
	muscle cramping, postural lightheadedness]	—	whether smoking (if appropriate)
—	ACE inhibitor, provide info to client, if not already on	—	compliance with activity
	[Capoten, Captopril, Enalapril, Lisinopril, Prinivil,	—	whether report problems to MD
	Quinapril, Vasotec, Zestril]	—	service delivery
	Diet		EMOTIONAL SUPPORT:
—	low salt	—	encouragement, reassurance, empathy
—	other therapeutic diet, if ordered [diabetic, avoid	—	caregiver support
—	excess fluid intake]	—	ADVOCACY:
—	potassium supplement, if ordered	—	attempt to change another on client's behalf (eg. __)
	How to monitor condition		REFERRING/ARRANGING: Services
—	weigh daily and call doctor if 3-5lb gain since last	—	if new home O2, obtain
—	visit (or as ordered)	—	if dependent in ADLs/IADLs - homemaker, personal
—	daily vital signs [B/P, pulse, resp] (or as ordered)	—	care to assist informals
—	increase in symptoms- call MD	—	if nec, arrange DME
	Activity:	—	if nec, arrange transp to med appointments
—	regular rest, activity restricted (if ordered)	—	if nec, assist to apply, advocate financial assist
—	exercise (as ordered)	—	if nec, refer to dietitian
—	sleep with head elevated (head of bed or pillows)	—	if cognitive impairment, Nsing [assist meds, safety
	Reduce stress:	—	issues]
—	avoid stress/ learn relaxation techniques	—	if incontinent, Nsing [eval to treat, training to manage
	Home Oxygen: (if ordered)	—	residual]
—	how to use O2, when to use	—	if caregiver burdened - respite, support group
—	how to maintain, clean equipment	—	if terminal, hospice
	Family education: (if nec or appropriate)	—	if nec, placement NH, residential, rehab facility
—	need for changes	—	other svc. as nec _____
—	need for family support	—	other svc. as nec _____
—	discuss advance directives		OTHER:
		—	Medication list complete [names, doses/ schedule,
		—	includes over-the-counter drugs]
		—	attention to co-morbidities(eg. _____)

Stroke Generic Care Plan

Instructions: code each aspect of implementation based on the evidence in the client record

Site: IA IN MI

Sample member: _____

Codes

- 1 = occurred (adequately)- Indirectly: Directly
- 2 = occurred (inadequately, eg untimely)- I: D
- 3 = did not occur
- 6 = did not occur; needed but client refused
- 8 = not appropriate, not needed (if nec), not ordered
- 9 = unable to determine, usual source missing

Code		Code	
TEACHING:		REFERRING/ARRANGING: Services	
Disease/condition:		if mobility or activities affected, PT	
what stroke is, means	___	if ADLs impaired, (and no PT) OT	
importance of controlling hypertension, if nec	___	if speech affected, speech therapy or set up communication system	
importance of rehab until no further progress is being made	___	if paralysis or paresis, nursing [for positioning, skin care, ROM]	
possible emotional sequelae	___	if vision, hearing affected, eval and correction	
		if swallowing problems -Nursing [maintain nutrition, care of feeding tube], speech therapy	
Medications:		if depression, evaluation and treatment	
know which medications are prescribed and what for	___	if nec and desired, support group	
importance of compliance	___	if cognitive impairment, Nsing [assist meds, safety issues]	
know symptoms of side effects/overdose, when to call MD	___	if incontinent, Nsing [eval to treat, training to manage residual]	
if on anticoagulants, get blood test as ordered	___	if dependent in ADLs/IADLs - homemaker, personal care to assist informals	
		if nec, re-eval for rehab after recuperation	
Diet:		if nec, arrange DME	
therapeutic diet, if ordered [low salt, diabetic, low cholesterol, liquid]	___	if nec, arrange transp to med appts	
Activity:		if nec assist to apply, advocate financial assist	
restricted, (as ordered)	___	if caregiver burdened - respite, support group	
exercise, (as recommended)	___	if terminal, hospice	
		if nec, placement NH, residential, rehab facility	
		other svc. as nec	___
Lifestyle and health habits:		ADDRESS SIGNS AND SYMPTOMS OF COMPLICATIONS:	
encourage social functioning, return to social roles	___	pressure sores - intensive nursing care	
if smoking, stop	___	peripheral nerve palsy - intensive rehab program	
get flu shot yearly	___	fecal incontinence - nsing re: bowel program	
get a pneumonia immunization [once]	___	adjustment to disability- nsing, PT, -rehab active, communication,	
Family education: (if nec or appropriate)	___	stroke club, counseling	
need for family support	___	withdrawal of family support - family meeting, counseling or therapy, respite	
discuss advance directives	___	depression - eval and treat, medications	
EMOTIONAL SUPPORT:		sensory deprivation - stimulating environment	
encouragement, reassurance, empathy	___	spasticity- MD- meds, PT exercise	
caregiver support	___	contractures - PT to treat, ROM to prevent further	
ADVOCACY:		shoulder problems- MD, rehab treat	
attempt to change another on client's behalf	___	falls - cm environmental assess and adapt, MD review meds	
		physical deconditioning- PT graded exercise program	
MONITORING:		other svc. as nec	___
functioning- ADLs	___	OTHER:	
functioning -emotional, cognitive	___	Medication list complete [names, doses/ schedule, includes OTC]	
compliance with medications, blood test	___	attention to co-morbidities	___
compliance with diet	___		
compliance with activity, exercises	___		
whether report problems to MD	___		
service delivery	___		

Chronic Obstructive Pulmonary Disease Generic Care Plan

Instructions: code each aspect of implementation based on the evidence in the client record

Codes

- 1 = occurred (adequately)- Indirectly, Directly
- 2 = occurred (inadequately, eg untimely)- I, D
- 3 = did not occur
- 6 = did not occur; needed but client refused
- 8 = not appropriate, not needed (if nec), not ordered
- 9 = unable to determine, usual source missing

Site IA IN MI

Sample member: _____

Code

Code

TEACHING:

Disease/condition:

- what disease is, means
- signs and symptoms of COPD [dyspnea, cough, whether productive; fatigue; loss of appetite]

Medications:

- know which medications are prescribed and what for
- whether using Metered Dose Inhaler (MDI) properly
- instruct re: compliance, take right amount regularly
- know symptoms of side effects, report to doctor

Pulmonary Rehabilitation:

- importance of follow through

Home Oxygen: (if ordered)

- how to use O2, when to use
- how to maintain, clean equipment

Diet:

- importance of adequate hydration
- importance of good nutrition- several small meals a day, if nec
- need for nutritional supplement, if ordered
- reduced calorie diet, if ordered for overweight

How to monitor

- spirometer use, (if ordered)
- increase in symptoms- call MD [change in cough, increase in sputum production or change in quality, onset of fever, increased difficulty in breathing]

Activity:

- restricted, (as ordered or recommended)
- exercise, (as ordered or recommended)

Lifestyle and health habits

- importance of smoking cessation (if smokes)
- avoid exercise that exceeds your exercise guidelines
- avoid coming in contact with people with colds
- need a flu shot yearly
- need a pneumonia immunization [once]

Family education: (if nec or appropriate)

- need for changes, esp smoking
- need for family support
- when to seek emergency medical care
- discuss advance directives

MONITORING:

- signs and symptoms
- whether smoking; use of gum, patch (if smokes)
- compliance with meds
- whether using MDI properly
- whether maintaining adequate food, fluid intake
- whether doing rec. respiratory exercises
- compliance with activity, general exercise
- whether using O2 as ordered
- whether report problems to MD
- service delivery

EMOTIONAL SUPPORT:

- reassure re: control of breathing, not suffocating
- encouragement, empathy re: smoking cessation
- caregiver support

ADVOCACY:

- attempt to change another on client's behalf

REFERRING/ARRANGING: Services

- if home O2, appropriate equipment, replacement
- if desired, support group for illness
- if nec, treatment group for smoking cessation
- if nec, ref to dietitian
- if dependent in ADLs/IADLs - homemaker, personal care to assist informals
- if incontinent, Nsing [eval to treat, training to manage residual]
- if nec, arrange transp to med appts
- if nec, assist to apply, advocate financial assist
- if caregiver burdened - respite, support group
- if terminal, hospice care
- if nec, placement NH, residential, rehab facility
- other svc. as nec _____
- other svc. as nec _____

OTHER:

- Medication list complete [names, doses/ schedule, includes OTC drugs]
- attention to co-morbidities

APPENDIX C
COMPANION TABLES FOR
CHAPTER V

TABLE C.1

ESTIMATED IMPACTS ON KEY MEDICARE OUTCOMES DURING
MONTHS 1 THROUGH 6 AND 7 THROUGH 12, ADMINASTAR

	Months 1-6		Months 7-12	
	Control Group Mean	Estimated Impact (P-Value)*	Control Group Mean	Estimated Impact (P-Value)*
Whether Any Hospital Admission (Percent)	38.0	0.0 (.99)	30.0	.8 (.41)
Whether Any Emergency Room Visit (Percent)	42.0	-.7 (.80)	34.7	1.5 (.60)
Total Part B Reimbursement (Dollars)	1,385	81 (.70)	1,407	-181 (.11)
Total Medicare Reimbursement (Dollars)	5,307	-172 (.76)	5,174	-413 (.42)
Number of Observations^b		1,110		1,110

SOURCE: National Claims History files 1993 through 1995.

NOTES: Impacts are estimated using logit models for binary outcome measures, and ordinary least squares models for continuous variables. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.)

*The p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bAll project study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, and beneficiaries who died prior to random assignment.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE C.2

ESTIMATED IMPACTS ON KEY MEDICARE OUTCOMES DURING
MONTHS 1 THROUGH 6 AND 7 THROUGH 12, IFMC

	Months 1-6		Months 7-12	
	Control Group Mean	Estimated Impact (P-Value) ^a	Control Group Mean	Estimated Impact (P-Value) ^a
Whether Any Hospital Admission (Percent)	48.2	-1.7 (.68)	31.4	-.1 (.96)
Whether Any Emergency Room Visit (Percent)	44.8	0.0 (.99)	35.5	-4.0 (.31)
Total Part B Reimbursement (Dollars)	2,093	235 (.30)	1,626	252 (.28)
Total Medicare Reimbursement (Dollars)	7,930	407 (.63)	4,920	458 (.51)
Number of Observations^b		586		586

SOURCE: National Claims History files 1993 through 1995.

NOTES: Impacts are estimated using logit models for binary outcome measures, and ordinary least squares models for continuous variables. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for beneficiaries in the IFMC project is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge, but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bAll project study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, and beneficiaries who died prior to random assignment.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE C.3
ESTIMATED IMPACTS ON KEY MEDICARE OUTCOMES DURING
MONTHS 1 THROUGH 6 AND 7 THROUGH 12,
PROVIDENCE HOSPITAL

	Months 1-6		Months 7-12	
	Control Group Mean	Estimated Impact (P-Value) ^a	Control Group Mean	Estimated Impact (P-Value) ^a
Whether Any Hospital Admission (Percent)	30.9	10.0 (.06)	26.0	6.1 (.22)
Whether Any Emergency Room Visit (Percent)	31.5	13.0 (.02)	26.1	7.8 (.12)
Total Part B Reimbursement (Dollars)	2,456	530 (.112)	1,900	255 (.41)
Total Medicare Reimbursement (Dollars)	10,489	1,032 (.55)	5,723	1,535 (.16)
Number of Observations^b		334		334

SOURCE: National Claims History files 1993 through 1995.

NOTES: Impacts are estimated using logit models for binary outcome measures, and ordinary least squares models for continuous variables. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for beneficiaries in the Providence Hospital project is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between December 1993 and May 1995 for the Providence Hospital project.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bAll project study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, and beneficiaries who died prior to random assignment.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE C.4
ESTIMATED IMPACTS ON NURSING HOME USE NOT REIMBURSED
BY MEDICARE DURING FIRST SIX MONTHS
(Percentages)

	AdminaStar		IFMC		Providence	
	Control Group Mean	Impact (P-Value) ^a	Control Group Mean	Impact (P-Value) ^a	Control Group Mean	Impact (P-Value) ^a
Whether Any Admission to a Nursing Home Without Full Medicare Reimbursement	3.0	-.8 [*] (.53)	10.1	-1.1 (.62)	1.0	7.3 ^{***} (.00)
Number of Observations		659		564		363

SOURCE: Evaluation's six-month follow-up telephone survey fielded between May 1994 and November 1995.

NOTE: Impacts are estimated using logit models for binary outcome measures. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

^a The p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero

^{*} Estimated as a simple difference of means.

^{*}Significantly different from zero at the .10 level, two-tailed test.

^{**}Significantly different from zero at the .05 level, two-tailed test.

^{***}Significantly different from zero at the .01 level, two-tailed test.

TABLE C.5
ESTIMATED IMPACTS ON MEDICARE REIMBURSEMENTS
DURING FIRST YEAR

	AdminaStar	IFMC	Providence
Total Medicare Reimbursements (Dollars)			
Impact	444	667	2,147
Control group mean	10,481	12,851	16,212
P-Value ^a	.48	.50	.24
Total Part A Medicare Reimbursements (Dollars) ^b			
Impact	37	174	2,161
Control group mean	7,689	9,131	11,857
P-Value ^a	.95	.84	.18
Total Part B Medicare Reimbursements (Dollars)			
Impact	-251*	364	448*
Control group mean	2,792	3,719	4,355
P-Value ^a	.09	.26	.10
Number of Observations^c	1,110	586	334

SOURCE: National Claims History files 1993 through 1995.

NOTES: Estimates were obtained using Tobit models, which account for the zero values for many sample members. The impact estimate is the difference between the expected value for all observations if they were a treatment group number and the expected value for all observations if they were a control group number.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bPart A hospital outpatient services are excluded. All hospital outpatient services are Part B services.

TABLE C.5 (continued)

^c All project study groups exclude beneficiaries whose Medicare identifiers did not match the Medicare eligibility files or did not have a seminal hospitalization on the claims files, beneficiaries who died prior to random assignment, and beneficiaries randomized after 1994 (and thus, did not have complete claims data for the first demonstration year).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE C.6

ESTIMATED SUBGROUP IMPACTS ON MEDICARE-COVERED SERVICES
DURING FIRST SIX MONTHS, ADMINASTAR

	Whether Any Hospital Admission (Proportion) (P-Value)*	Whether Any Emergency Room Visit (Proportion) (P-Value)*	Reimbursements for Physician and Other Part B Visits (Dollars) (P-Value)*	Total Medicare Reimbursements (Dollars) (P-Value)*
Age				
Age 85 or younger	.01 (.75)	.00 (.99)	-35 (.57)	-80 (.89)
Over age 85	-.06 (.33)	-.06 (.38)	-45 (.74)	-779 (.55)
Education				
Completed high school	-.01 (.80)	-.03 (.62)	-140 (.16)	-779 (.32)
Failed to complete high school	.034 (.53)	.01 (.93)	68 (.53)	377 (.66)
Marital Status				
Married	.02 (.63)	.00 (.98)	51 (.62)	339 (.68)
Never married or no longer married	.00 (.99)	-.01 (.85)	-106 (.30)	-693 (.39)
Urban/Rural Residence				
Beneficiary lives in a rural area	.00 (.99)	.04 (.38)	-63 (.54)	31 (.98)
Beneficiary lives in an urban area	.00 (.97)	-.03 (.38)	-23 (.75)	-296 (.67)
Income				
Below \$10,000	-.04 (.50)	.02 (.72)	-150 (.33)	-363 (.73)
Above \$10,000	-.02 (.76)	-.01 (.79)	101 (.22)	277 (.71)
Medicare Reimbursements in Year Prior to Enrollment				
Top quartile	.07 (.21)	.10* (.09)	79 (.43)	361 (.75)
Middle two quartiles	-.04 (.38)	-.05 (.21)	-10 (.91)	-119 (.88)
Bottom quartile	-.01 (.93)	-.03 (.61)	-282** (.03)	-1,059 (.36)
Months since Last Preenrollment Hospitalization				
Within last month	.06 (.16)	.03 (.55)	-17 (.86)	-472 (.59)
Between one and six months	-.02 (.84)	-.14 (.19)	-84 (.69)	-773 (.70)
Longer than six months	-.05 (.19)	-.02 (.70)	-46 (.59)	193 (.82)
Diabetic Comorbidity				
Diabetic	-.03 (.63)	-.04 (.42)	-112 (.31)	350 (.73)
Not diabetic	.01 (.84)	.00 (.90)	-11 (.88)	-477 (.49)

TABLE C.6 (continued)

	Whether Any Hospital Admission (Proportion) (P-Value) ^a	Whether Any Emergency Room Visit (Proportion) (P-Value) ^a	Reimbursements for Physician and Other Part B Visits (Dollars) (P-Value) ^a	Total Medicare Reimbursements (Dollars) (P-Value) ^a
CHF Etiology				
Ischemic	-.05 (.29)	-.04 (.35)	-.87 (.36)	-.425 (.22)
Hypertensive	-.03 (.57)	-.13** (.03)	-.164 (.16)	-1.565 (.17)
Idiopathic	.15** (.03)	.11 (.11)	271** (.05)	2.871** (.03)
Other causes	-.02 (.79)	.13* (.07)	-.70 (.67)	-1.065 (.48)
Number of Observations ^b	1,110	1,110	1,110	1,110

SOURCE: National Claims History files 1993 through 1995; evaluation six-month follow-up survey; AdminaStar Patients Assisted to Healthy Hearts project database.

NOTE: Impacts are estimated using logit models for binary outcome measures, ordinary least squares regression models for continuous variables, and Tobit models for variables truncated at zero. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for AdminaStar is the 6 months following December 17, 1993, for the first wave of identified beneficiaries and is the 6 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.)

^a The p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero

^b Study group sizes differ for education (658); marital status (664); income (597); diabetic (1,106), and CHF Etiology (1,106).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE C.7
ESTIMATED SUBGROUP IMPACTS ON MEDICARE-COVERED SERVICES
DURING FIRST SIX MONTHS, IFMC

	Whether Any Hospital Admission (Proportion) (P-Value) ^a	Whether Any Emergency Room Visit (Proportion) (P-Value) ^a	Reimbursements for Physician and Other Part B Visits (Dollars) (P-Value) ^a	Total Medicare Reimbursements (Dollars) (P-Value) ^a
Age				
Age 85 or younger	-.05 (.21)	-.01 (.74)	101 (.36)	369 (.63)
Over age 85	.04 (.65)	.00 (.96)	-.57 (.80)	551 (.73)
Education				
Completed high school	-.04 (.44)	-.03 (.49)	-.55 (.71)	-409 (.71)
Failed to complete high school	-.07 (.24)	.01 (.93)	227 (.22)	1165 (.36)
Marital Status				
Married	-.08 (.17)	-.05 (.41)	-120 (.48)	-254 (.83)
Never married or no longer married	-.02 (.65)	.01 (.87)	204 (.17)	792 (.47)
Urban/Rural Residence				
Beneficiary lives in a rural area	-.08 (.33)	-.01 (.90)	-171 (.49)	-407 (.81)
Beneficiary lives in an urban area	-.03 (.53)	-.01 (.77)	-137 (.24)	590 (.48)
Income				
Below \$10,000	-.09 (.14)	-.4 (.50)	-10 (.96)	-257 (.85)
Above \$10,000	.01 (.90)	.01 (.87)	115 (.47)	445 (.70)
Medicare Reimbursements in Year Prior to Enrollment				
Top quartile	-.04 (.60)	.09 (.21)	26 (.89)	-46 (.98)
Middle two quartiles	-.05 (.33)	-.04 (.46)	95 (.53)	588 (.57)
Bottom quartile	.00 (.98)	-.06 (.42)	129 (.55)	576 (.70)
Months Since Last Preenrollment Hospitalization				
Within last month	-.03 (.78)	.03 (.74)	143 (.60)	-174 (.93)
Between one and six months	-.04 (.38)	-.03 (.52)	68 (.57)	481 (.56)
Longer than six months	-.08 (.63)	.18 (.29)	70 (.89)	425 (.91)
Target Diagnosis				
Beneficiary has chronic obstructive pulmonary disease	-.04 (.58)	.02 (.78)	104 (.60)	1,815 (.18)
Beneficiary has congestive heart failure	-.04 (.41)	-.03 (.54)	54 (.66)	-245 (.78)
Number of Observations^b	735	735	735	735

SOURCE: National Claims History files 1993 through 1995; evaluation six-month follow-up survey, IFMC Catastrophe Case Management database.

NOTE: Impacts are estimated using logit models for binary outcome measures, ordinary least squares regression models for continuous variables, and Tobit models for variables truncated at zero. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

TABLE C.7 (continued)

The period of observation for beneficiaries in the IFMC project is the six months following the date of random assignment if the beneficiary was randomized after hospital discharge, but the six months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project.

^aThe p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero.

^bStudy group sizes differ for education (636); marital status (648); and income (564).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE C.8
ESTIMATED SUBGROUP IMPACTS ON MEDICARE-COVERED SERVICES
DURING FIRST SIX MONTHS, PROVIDENCE HOSPITAL

	Whether Any of Hospital Admission (Proportion) (P-Value) ^a	Whether Any Emergency Room Visit (Proportion) (P-Value) ^a	Reimbursements for Physician and Other Part B Visits (Dollars) (P-Value) ^a	Total Medicare Reimbursements (Dollars) (P-Value) ^a
Age				
Age 85 or younger	.07 (.16)	.11** (.02)	80 (.68)	778 (.63)
Over age 85	.12 (.22)	.21** (.04)	78 (.84)	2,519 (.59)
Education				
Completed high school	-.03 (.58)	.04 (.47)	-467** (.03)	-3,147 (.11)
Failed to complete high school	.13* (.09)	.18** (.03)	272 (.37)	2,963 (.25)
Marital Status				
Married	.14** (.04)	.26*** (.00)	211 (.38)	1,865 (.40)
Never married or no longer married	-.05 (.45)	-.05 (.43)	-469* (.06)	-2,067 (.34)
Income				
Below \$10,000	.00 (.99)	.00 (.99)	-492* (~.20)	-2,750 (.37)
Above \$10,000	.08 (.22)	.16** (.01)	97 (.65)	1,244 (.53)
Medicare Reimbursements in Year Prior to Enrollment				
Top quartile	.17* (.09)	.21** (.03)	-33 (.93)	-867 (.77)
Middle two quartiles	.07 (.26)	.18*** (.01)	184 (.47)	2,375 (.27)
Bottom quartile	.02 (.85)	-.00 (.96)	-24 (.95)	361 (.91)
Months Since Last Preenrollment Hospitalization				
Within last month	.11 (.56)	-.12 (.54)	327 (.66)	4,654 (.44)
Between one and six months	.07 (.17)	.14*** (.01)	54 (.79)	760 (.65)
Longer than six months	.13 (.32)	.25 (.12)	144 (.80)	1,238 (.81)
Morale/Depression Level				
Is depressed and/or has low morale	.08 (.36)	.14 (.12)	266 (.42)	1,156 (.67)
Has no indication of poor morale/depression	.10* (.08)	.12** (.04)	50 (.82)	987 (.61)
Target Condition				
CHF, COPD, or joint replacement	.05 (.55)	.09 (.29)	-161 (.63)	968 (.73)
Other target conditions	.10* (.07)	.16* (.06)	164 (.46)	1,066 (.56)
Number of Observations ^b	417	417	417	417

SOURCE: National Claims History files 1993 through 1995; evaluation six-month follow-up survey; Geriatric Case Management database.

NOTES: Impacts are estimated using logit models for binary outcome measures, ordinary least squares regression models for continuous variables, and Tobit models for variables truncated at zero. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

TABLE C.8 (continued)

The period of observation for beneficiaries in the Providence Hospital projects is the six months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral) but the six months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between December 1993 and May 1995 for the Providence Hospital project.

*The p-value for each estimate is from the test of whether the coefficient on treatment status in the model is significantly different from zero

^bStudy group size differs for education (328); marital status (387); income (323); morale/depression (377) and target condition (416).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE C.9

ESTIMATED LOGIT COEFFICIENTS, ANY INPATIENT HOSPITAL ADMISSION DURING FIRST YEAR

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	-.407	.69	1.512	.32	-1.590	.66
Treatment/control status	.091	.46	-.065	.71	.434	.06
Number of physicians per 10,000 residents for county	-.003	.71	-.005	.62	-.021	.42
Number of nursing home beds per 100 elderly residents for county	.019	.53	-.030	.54	-.877	.30
Average Medicare reimbursement per enrollee (\$) for county	.000	.42	-.000	.81	.001	.44
Age	.006	.53	-.006	.60	.043	.01
Male	.072	.57	-.036	.84	-.088	.71
White	-.078	.74	.012	.98	-.111	.71
Total Medicare reimbursement during year before reference date (\$10K)	.008	.13	.019	.01	.035	.00
Original reason for Medicare eligibility was "old age"	-.360	.07	-.409	.15	-.314	.36
Number of secondary diagnoses associated with last hospitalization before reference date	.046	.25	.004	.92	-.036	.69
Was last hospitalized between 31 and 183 days before reference date	-.317	.20	-.678	.01	-.035	.94
Was last hospitalized more than 183 days before reference date	-.631	.01	-.860	.07	-.547	.26
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	.378	.07	n.a.	n.a.
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	.010	.98
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	-.337	.32
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	-.433	.26
Number of Observations	1,110		586		334	

SOURCE: National Claims History files 1993 through 1995.

NOTE: The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

n.a. = not applicable.

TABLE C.10

ESTIMATED TOBIT COEFFICIENTS, NUMBER OF INPATIENT HOSPITAL DAYS DURING FIRST YEAR

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	2.713	.83	21.959	.22	-15.320	.74
Treatment/control status	.548	.71	.065	.97	3.759	.23
Number of physicians per 10,000 residents for county	.036	.68	.018	.88	-.264	.39
Number of nursing home beds per 100 elderly residents for county	.186	.60	-.290	.62	-4.874	.60
Average Medicare reimbursement per enrollee (\$) for county	.004	.15	.003	.44	.004	.61
Age	-.073	.52	-.288	.04	.493	.03
Male	.582	.70	-.408	.84	-1.031	.75
White	-2.373	.41	-4.274	.50	-9.159	.02
Total Medicare reimbursement during year before reference date (\$10K)	.106	.08	.137	.07	.426	.00
Original reason for Medicare eligibility was "old age"	-5.470	.02	-3.217	.30	-9.771	.03
Number of secondary diagnoses associated with last hospitalization before reference date	.730	.13	.728	.13	1.492	.20
Was last hospitalized between 31 and 183 days before reference date	-4.510	.10	-8.584	.01	-3.536	.58
Was last hospitalized more than 183 days before reference date	-9.002	.00	-14.982	.01	-4.559	.52
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	4.771	.04	-5.443	.41
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	-.270	.96
Target diagnosis was transient ischemic attack	n.a.	n.a.	n.a.	n.a.	-18.141	.16
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	-14.047	.01
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	-5.651	.34
Target diagnosis was diabetes	n.a.	n.a.	n.a.	n.a.	-15.210	.27
Target diagnosis was decubiti	n.a.	n.a.	n.a.	n.a.	-161.039	1.00
Target diagnosis was nutritional/metabolic disorder	n.a.	n.a.	n.a.	n.a.	-14.796	.22
Target diagnosis was pneumonia or community referral	n.a.	n.a.	n.a.	n.a.	-8.942	.09
Target diagnosis was miscellaneous disorder (other than chronic heart disease)	n.a.	n.a.	n.a.	n.a.	-5.915	.50
Number of Observations	1,110		586		334	

TABLE C.10 (continued)

SOURCE: National Claims History files 1993 through 1995.

NOTE: The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

n.a. = not applicable.

TABLE C.11

ESTIMATED LOGIT COEFFICIENTS, ANY EMERGENCY ROOM VISIT DURING FIRST YEAR

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	.201	.85	1.907	.21	-1.528	.69
Treatment/control status	.104	.40	-.077	.66	.775	.00
Number of physicians per 10,000 residents for county	-.008	.27	-.015	.16	.031	.26
Number of nursing home beds per 100 elderly residents for county	-.002	.96	-.059	.23	2.239	.07
Average Medicare reimbursement per enrollee (\$) for county	.000	.15	.000	.77	-.003	.05
Age	.000	.96	-.010	.42	.040	.02
Male	.074	.56	-.244	.17	.192	.43
White	-.179	.46	-.437	.44	-.446	.15
Total Medicare reimbursement during year before reference date (\$10K)	.010	.09	.013	.07	.024	.02
Original reason for Medicare eligibility was "old age"	-.283	.16	-.445	.12	-.474	.18
Number of secondary diagnoses associated with last hospitalization before reference date	.001	.97	.070	.09	.111	.22
Was last hospitalized between 31 and 183 days before reference date	-.326	.20	-.226	.39	-.329	.51
Was last hospitalized more than 183 days before reference date	-.484	.06	-.502	.28	.046	.92
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	.460	.03	n.a.	n.a.
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	-.024	.95
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	-.427	.21
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	-.712	.07
Number of Observations	1,110		586		334	

SOURCE: National Claims History files 1993 through 1995.

NOTE: The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

n.a. = not applicable.

TABLE C.12

ESTIMATED TOBIT COEFFICIENTS, PHYSICIAN AND OTHER PART B REIMBURSEMENT DURING FIRST YEAR

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	3,087.039	.00	6,847.417	.00	7,272.851	.18
Treatment/control status	-170.755	.17	-48.680	.84	403.722	.27
Number of physicians per 10,000 residents for county	6.758	.36	21.064	.13	-42.236	.26
Number of nursing home beds per 100 elderly residents for county	21.105	.48	-83.643	.21	-811.850	.49
Average Medicare reimbursement per enrollee (\$) for county	.498	.02	-.320	.42	.132	.89
Age	-39.227	.00	-53.665	.00	10.554	.70
Male	58.059	.65	383.186	.11	-253.036	.51
White	-168.021	.49	87.390	.91	-1,029.123	.03
Total Medicare reimbursement during year before reference date (\$10K)	17.059	.00	8.611	.33	76.380	.00
Original reason for Medicare eligibility was "old age"	-289.111	.14	11.749	.97	-1,112.605	.04
Number of secondary diagnoses associated with last hospitalization before reference date	110.405	.01	139.609	.01	147.866	.29
Was last hospitalized between 31 and 183 days before reference date	133.349	.58	-813.674	.02	-34.296	.96
Was last hospitalized more than 183 days before reference date	-62.577	.80	-626.474	.32	-49.659	.58
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	1,356.000	.00	913.295	.26
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	-843.068	.25
Target diagnosis was transient ischemic attack	n.a.	n.a.	n.a.	n.a.	-2,165.850	.13
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	-1,520.163	.02
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	-1,915.895	.01
Target diagnosis was diabetes	n.a.	n.a.	n.a.	n.a.	176.140	.91
Target diagnosis was decubiti	n.a.	n.a.	n.a.	n.a.	-2,288.739	.18
Target diagnosis was nutritional/metabolic disorder	n.a.	n.a.	n.a.	n.a.	-1,425.735	.33
Target diagnosis was pneumonia or community referral	n.a.	n.a.	n.a.	n.a.	-393.097	.53
Target diagnosis was miscellaneous disorder (other than chronic heart disease)	n.a.	n.a.	n.a.	n.a.	523.705	.63
Number of Observations	1,110		586		334	

TABLE C.12 (continued)

SOURCE: National Claims History files 1993 through 1995.

NOTE: The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

n.a. = not applicable.

TABLE C.13

ESTIMATED ORDINARY LEAST SQUARES COEFFICIENTS, TOTAL MEDICARE REIMBURSEMENT DURING FIRST YEAR

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	6,423.968	.36	37,094.000	.00	18,047.000	.61
Treatment/control status	-585.301	.48	800.693	.52	2,280.615	.34
Number of physicians per 10,000 residents for county	80.598	.11	84.743	.25	-257.546	.28
Number of nursing home beds per 100 elderly residents for county	148.722	.46	-548.956	.12	-6,475.476	.39
Average Medicare reimbursement per enrollee (\$) for county	3.003	.03	-3.015	.15	5.118	.41
Age	-59.551	.36	-217.657	.01	240.137	.17
Male	-397.651	.64	364.642	.77	-1,149.705	.64
White	-1,656.759	.31	-937.154	.81	-8,002.107	.01
Total Medicare reimbursement during year before reference date (\$10K)	150.626	.00	101.138	.03	434.319	.00
Original reason for Medicare eligibility was "old age"	-3,535.642	.01	78.144	.97	-5,897.156	.09
Number of secondary diagnoses associated with last hospitalization before reference date	470.702	.09	609.345	.04	827.498	.35
Was last hospitalized between 31 and 183 days before reference date	-473.028	.77	-5,575.805	.00	-2,883.441	.56
Was last hospitalized more than 183 days before reference date	-1,916.973	.25	-6,740.718	.04	-2,816.078	.59
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	2,712.438	.06	-4,463.262	.39
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	-3,288.171	.48
Target diagnosis was transient ischemic attack	n.a.	n.a.	n.a.	n.a.	-16,277.000	.08
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	-11,688.000	.01
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	-10,086.000	.03
Target diagnosis was diabetes	n.a.	n.a.	n.a.	n.a.	-8,412.709	.40
Target diagnosis was decubiti	n.a.	n.a.	n.a.	n.a.	-17,444.000	.12
Target diagnosis was nutritional/metabolic disorder	n.a.	n.a.	n.a.	n.a.	-12,117.000	.20
Target diagnosis was pneumonia or community referral	n.a.	n.a.	n.a.	n.a.	-7,988.952	.05
Target diagnosis was miscellaneous disorder (other than chronic heart disease)	n.a.	n.a.	n.a.	n.a.	669.276	.92
Number of Observations	1,110		586		334	

TABLE C.13 (continued)

SOURCE: National Claims History files 1993 through 1995.

NOTE: The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.) The period of observation for beneficiaries in the IFMC and Providence Hospital projects is the 12 months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral), but the 12 months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project and between December 1993 and May 1995 for the Providence Hospital project.

n.a. = not applicable.

APPENDIX D
COMPANION TABLES FOR
CHAPTER VI

TABLE D.1
ESTIMATED SUBGROUP IMPACTS ON QUALITY INDICATORS
DURING FIRST SIX MONTHS, ADMINASTAR

	Percent with Hospital Admission (P-Value)*	Percent Who Forgot to Take Prescribed Heart Medications (P-Value)*	Percent Who Had Swelling in Feet or Ankles (P-Value)*
Age			
Age 85 or younger	.9 (.75)	0.0 (.98)	-4.1 (.33)
Over age 85	-6.2 (.33)	0.4 (.95)	.3 (.98)
Education			
Completed high school	-1.3 (.80)	-1.1 (.77)	-2.3 (.67)
Failed to complete high school	3.6 (.53)	1.9 (.66)	-5.9 (.32)
Marital Status			
Married	2.5 (.63)	-3.0 (.43)	1.5 (.79)
Never married or no longer married	.1 (.99)	3.3 (.43)	-8.3 (.14)
Urban/Rural Residence			
Beneficiary lives in a rural area	0.1 (.99)	4.8 (.32)	-10.8 (.11)
Beneficiary lives in an urban area	-1 (.97)	-2.1 (.55)	.3 (.95)
Income			
Below \$10,000	4.3 (.50)	-2.4 (.62)	-6.8 (.30)
Above \$10,000	1.6 (.75)	2.8 (.45)	-2.5 (.66)

TABLE D.1 (continued)

	Percent with Hospital Admission (P-Value) ^a	Percent Who Forgot to Take Prescribed Heart Medications (P-Value) ^a	Percent Who Had Swelling in Feet or Ankles (P-Value) ^a
Medicare Reimbursements in Year Prior to Enrollment			
Top quartile	7.0 (.21)	3.0 (.54)	-5.0 (.50)
Middle two quartiles	-3.6 (.38)	-5.6 (.12)	-1.3 (.82)
Bottom quartile	-.5 (.93)	13.1* (.10)	-7.6 (.36)
Time Since Last Preenrollment Hospitalization			
Within last month	6.3 (.16)	.7 (.86)	1.3 (.83)
Between one and six months	-2.1 (.84)	7.5 (.51)	-20.3 (.18)
Longer than six months	-5.3 (.19)	-1.3 (.76)	-5.2 (.35)
Diabetic Comorbidity			
Diabetic	-2.5 (.63)	2.9 (.53)	.6 (.93)
Not diabetic	.7 (.84)	-.1 (.78)	-6.3 (.19)
CHF Etiology			
Ischemic	-4.9 (.29)	.9 (.84)	-7.6 (.24)
Hypertensive	-3.1 (.58)	-.8 (.88)	.2 (.99)
Idiopathic	-14.7** (.03)	.1 (.99)	-4.1 (.66)
Other causes	2.0 (.79)	-1.3 (.86)	-1.8 (.87)
Number of Observations^a	1,110	607	497

TABLE D.1 (continued)

SOURCE: National Claims History files 1993 through 1995; evaluation six-month follow-up survey; AdminaStar Patients Assisted to Healthy Hearts project database.

NOTE: Impacts are estimated using logit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for AdminaStar is the 12 months following December 17, 1993, for the first wave of identified beneficiaries and is the 12 months following April 15, 1994, for the second wave. (These are the dates of random assignment for beneficiaries who enrolled in the AdminaStar project.)

*Study group size differs for education (658), marital status (664), income (597), diabetic comorbidity (604), and etiology (1,106) for each variable. Numbers shown are for hospital admissions.

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.2

ESTIMATED SUBGROUP IMPACTS ON QUALITY INDICATORS
DURING FIRST SIX MONTHS, IFMC

	Percent with Hospital Admission (P-Value) ^a	Percent Who Forgot to Take Prescribed Heart Medications (P-Value) ^a	Percent Who had Swelling in Feet or Ankles (P-Value) ^a
Age			
Age 85 or younger	3.6 (.64)	-4.9 (.49)	-9.7 (.30)
Over age 85	-4.8 (.21)	1.0 (.80)	-5.5 (.31)
Education			
Completed high school	-3.9 (.45)	2.3 (.62)	-6.6 (.31)
Failed to complete high school	-7.2 (.24)	-3.0 (.59)	-6.0 (.47)
Marital Status			
Married	-8.0 (.17)	-1.6 (.74)	-9.4 (.21)
Never married or no longer married	-2.3 (.66)	1.9 (.70)	-3.7 (.58)
Urban/Rural Residence			
Beneficiary lives in a rural area	-8.0 (.33)	.4 (.96)	-19.6* (.07)
Beneficiary lives in an urban area	-2.5 (.53)	0.0 (.99)	-2.6 (.65)
Income			
Below \$10,000	-9.2 (.15)	10.6* (.08)	-9 (.91)
Above \$10,000	.7 (.89)	-4.2 (.33)	-10.5 (.14)

TABLE D.2 (continued)

	Percent with Hospital Admission (P-Value)*	Percent Who Forgot to Take Prescribed Heart Medications (P-Value)*	Percent Who had Swelling in Feet or Ankles (P-Value)*
Medicare Reimbursements in Year Prior to Enrollment			
Top quartile	-3.8 (.60)	.2 (.97)	-4.5 (.56)
Middle two quartiles	-5.0 (.33)	1.1 (.82)	-4.8 (.47)
Bottom quartile	-.1 (.99)	-3.9 (.97)	-4.8 (.57)
Time Since Last Preenrollment Hospitalization			
Within last month	-2.7 (.78)	-3.1 (.72)	-3.5 (.83)
Between one and six months	-3.6 (.38)	1.7 (.67)	-7.1 (.20)
Longer than six months	-8.3 (.63)	-21.1 (.29)	1.0 (.96)
Target Diagnosis			
Beneficiary has COPD	-3.6 (.58)	NR	NR
Beneficiary has CHF	-3.6 (.41)	NR	NR
Number of Observations^b	735	360	370

SOURCE: National Claims History files 1993 through 1995; evaluation six-month follow-up survey, IFMC Catastrophic Case Management database.

NOTE: Impacts are estimated using logit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for beneficiaries in the IFMC project is the six months following the date of random assignment if the beneficiary was randomized after hospital discharge, but the six months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between October 1993 and March 1995 for the IFMC project.

TABLE D.2 (continued)

*Study group size differs for education (636), marital status (648), and income (564). Numbers shown are for hospital admissions.

NR = Not relevant

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.3

ESTIMATED SUBGROUP IMPACTS ON QUALITY INDICATORS
DURING FIRST SIX MONTHS, PROVIDENCE HOSPITAL

	Percent with Hospital Admission (P-Value)*
Age	
Age 85 or younger	6.5 (.18)
Over age 85	15.7 (.11)
Education	
Completed high school	-3.8 (.51)
Failed to complete high school	-14.5* (.08)
Marital Status	
Married	14.0** (.03)
Never married or no longer married	-5.4 (.41)
Income	
Below \$10,000	1.2 (.90)
Above \$10,000	6.4 (.29)
Medicare Reimbursements in Year Prior to Enrollment	
Top quartile	14.8 (.13)
Middle two quartiles	8.0 (.19)
Bottom quartile	1.4 (.86)
Time Since Last Preenrollment Hospitalization	
Within last month	10.0 (.58)
Between one and six months	7.3 (.14)
Longer than six months	15.4 (.31)

TABLE D.3 (continued)

	Percent with Hospital Admission (P-Value) ^a
Morale/Depression Level	
Is depressed and/or has low morale	10.0 (.58)
Has no indication of poor morale/depression	7.3 (.14)
Target Condition	
Chronic Heart Failure, Chronic Obstructive Pulmonary Disease, or joint replacement	6.7 (.44)
Other target conditions	9.7* (.06)
Number of Observations^b	417

SOURCE: National Claims History files 1993 through 1995; evaluation six-month follow-up survey; Providence Hospital Geriatric Case Management database.

NOTE: Impacts are estimated using logit models. The impact estimate is the difference between the expected value for all observations if they were a treatment group member and the expected value for all observations if they were a control group member.

The period of observation for beneficiaries in the Providence Hospital project is the six months following the date of random assignment if the beneficiary was randomized after hospital discharge (or was a Providence Hospital community referral) but the six months following the day after hospital discharge if the beneficiary was randomized while in the hospital. Random assignment took place between December 1993 and May 1995 for the Providence Hospital project.

^aStudy group size differs for education (392), marital status (387), and income (323).

*Significantly different from zero at the .10 level, two-tailed test.

**Significantly different from zero at the .05 level, two-tailed test.

***Significantly different from zero at the .01 level, two-tailed test.

TABLE D.4

ESTIMATED ORDINARY LEAST SQUARES COEFFICIENTS, SELF-CARE DURING FIRST SIX MONTHS

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	.467	.01	.743	.00	-.308	.74
Treatment/control status	.128	.00	-.004	.86	.010	.83
Number of physicians per 10,000 residents for county	-.000	.96	.001	.60	-.001	.87
Number of nursing home beds per 100 elderly residents for county	.000	.72	-.000	.19	-.005	.12
Average Medicare reimbursement per enrollee (\$) for county	.000	.79	-.000	.07	.001	.09
Age	-.000	.84	.002	.34	-.000	.95
Male	-.002	.95	.003	.89	-.013	.78
White	.013	.77	.025	.72	-.125	.02
Total Medicare reimbursement during year before reference date (\$10K)	.001	.34	.001	.15	-.001	.49
Original reason for Medicare eligibility was "old age"	.007	.85	-.002	.95	-.047	.42
Number of secondary diagnoses associated with last hospitalization before reference date	.015	.04	.000	.95	.005	.77
Was last hospitalized between 31 and 183 days before reference date	-.014	.76	-.058	.10	.054	.55
Was last hospitalized more than 183 days before reference date	-.043	.37	-.117	.05	*	n.a.
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	.173	.00	.097	.16
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	.165	.02
Target diagnosis was transient ischemic attack	n.a.	n.a.	n.a.	n.a.	b	n.a.
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	.430	.00
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	b	n.a.
Target diagnosis was diabetes	n.a.	n.a.	n.a.	n.a.	-.417	.00
Target diagnosis was decubiti	n.a.	n.a.	n.a.	n.a.	-.543	.00
Target diagnosis was nutritional/metabolic disorder	n.a.	n.a.	n.a.	n.a.	-.467	.02
Target diagnosis was pneumonia or community referral	n.a.	n.a.	n.a.	n.a.	b	n.a.
Target diagnosis was miscellaneous disorder (other than chronic heart disease)	n.a.	n.a.	n.a.	n.a.	b	n.a.
Number of Observations	618		552		159	

TABLE D.4 (continued)

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

^a Control variable dropped due to lack of variation.

^b Care index could not be constructed for all diagnosis groups.

n.a. = not applicable.

TABLE D.5

ESTIMATED ORDINARY LEAST SQUARES COEFFICIENTS, SYMPTOM CONTROL DURING FIRST SIX MONTHS

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	.125	.58	.333	.16	.611	.42
Treatment/control status	.001	.97	.051	.07	.015	.71
Number of physicians per 10,000 residents for county	.000	.91	-.001	.55	.004	.44
Number of nursing home beds per 100 elderly residents for county	.000	.10	.000	.91	.001	.61
Average Medicare reimbursement per enrollee (\$) for county	.000	.63	.000	.15	-.000	.75
Age	.001	.73	.000	1.00	-.004	.17
Male	.077	.00	-.004	.88	.026	.53
White	-.036	.48	.052	.54	.047	.34
Total Medicare reimbursement during year before reference date (\$10K)	-.000	.99	.000	.79	-.002	.26
Original reason for Medicare eligibility was "old age"	.138	.00	.071	.10	.055	.33
Number of secondary diagnoses associated with last hospitalization before reference date	.007	.40	-.003	.62	-.013	.38
Was last hospitalized between 31 and 183 days before reference date	.085	.12	.128	.00	.014	.88
Was last hospitalized more than 183 days before reference date	.122	.03	-.025	.73	^a	n.a.
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	-.380	.00	-.033	.65
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	.226	.00
Target diagnosis was transient ischemic attack	n.a.	n.a.	n.a.	n.a.	^b	n.a.
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	.116	.05
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	.332	.00
Target diagnosis was diabetes	n.a.	n.a.	n.a.	n.a.	-.046	.79
Target diagnosis was decubiti	n.a.	n.a.	n.a.	n.a.	.388	.00
Target diagnosis was nutritional/metabolic disorder	n.a.	n.a.	n.a.	n.a.	.168	.33
Target diagnosis was pneumonia or community referral	n.a.	n.a.	n.a.	n.a.	^b	n.a.
Target diagnosis was miscellaneous disorder (other than chronic heart disease)	n.a.	n.a.	n.a.	n.a.	^b	n.a.
Number of Observations	595		523		215	

TABLE D.5 (continued)

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

^a Control variable dropped due to lack of variation.

^b Symptom control index could not be constructed for all diagnosis groups.

n.a. = not applicable.

TABLE D.6

ESTIMATED LOGIT COEFFICIENTS, SATISFACTION WITH GETTING QUESTIONS ANSWERED DURING FIRST SIX MONTHS

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	.870	.66	2.364	.19	122.800	.53
Treatment/control status	.321	.16	.258	.27	-.292	.32
Number of physicians per 10,000 residents for county	-.008	.56	.011	.46	-1.122	.52
Number of nursing home beds per 100 elderly residents for county	.000	.68	.000	.86	-.419	.52
Average Medicare reimbursement per enrollee (\$) for county	-.000	.94	.000	.99	.018	.49
Age	.019	.29	-.010	.50	-.004	.84
Male	.130	.58	-.266	.27	.081	.79
White	.255	.53		n.a.	.046	.90
Total Medicare reimbursement during year before reference date (\$10K)	-.017	.06	-.018	.02	-.025	.01
Original reason for Medicare eligibility was "old age"	.249	.45		n.a.	.085	.85
Number of secondary diagnoses associated with last hospitalization before reference date	-.026	.73	.029	.59	.035	.76
Was last hospitalized between 31 and 183 days before reference date	-1.031	.07	.303	.43	.929	.27
Was last hospitalized more than 183 days before reference date	-.906	.12		n.a.	-.815	.21
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	.279	.33	.271	.68
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	-.158	.75
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	.274	.57
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	1.274	.07
Target diagnosis was diabetes	n.a.	n.a.	n.a.	n.a.	.084	.95
Target diagnosis was pneumonia or community referral	n.a.	n.a.	n.a.	n.a.	.564	.24
Target diagnosis was miscellaneous disorder (other than chronic heart disease)	n.a.	n.a.	n.a.	n.a.	-.719	.30
Number of Observations	634		629		376	

TABLE D.6 (continued)

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

* Control variable dropped due to lack of variation.

n.a. = not applicable.

TABLE D.7

ESTIMATED LOGIT COEFFICIENTS, SATISFACTION WITH PREVENTION ADVICE DURING FIRST SIX MONTHS

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	-1.866	.45	1.314	.51	12.422	.75
Treatment/control status	.806	.01	.374	.17	-.205	.53
Number of physicians per 10,000 residents for county	.007	.70	.016	.36	-.071	.84
Number of nursing home beds per 100 elderly residents for county	.001	.35	.000	.55	-.022	.87
Average Medicare reimbursement per enrollee (\$) for county	.000	.62	-.000	.98	.000	.96
Age	.020	.38	.005	.74	-.015	.53
Male	-.138	.65	-.082	.76	.018	.96
White	1.069	.02	*	n.a.	-.321	.43
Total Medicare reimbursement during year before reference date (\$10K)	.026	.14	-.006	.50	-.014	.23
Original reason for Medicare eligibility was "old age"	.497	.22	*	n.a.	1.165	.00
Number of secondary diagnoses associated with last hospitalization before reference date	-.074	.45	-.027	.66	-.056	.68
Was last hospitalized between 31 and 183 days before reference date	-.147	.83	-.026	.95	-.085	.90
Was last hospitalized more than 183 days before reference date	-.353	.61	*	n.a.	.600	.50
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	-.156	.61	.130	.86
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	-.881	.11
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	.012	.98
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	.606	.41
Target disease was diabetes	n.a.	n.a.	n.a.	n.a.	-.880	.38
Target disease was pneumonia or community referral	n.a.	n.a.	n.a.	n.a.	-.173	.73
Target disease was miscellaneous disorder (other than chronic heart disease)	n.a.	n.a.	n.a.	n.a.	.498	.66
Number of Observations	623		586		348	

TABLE D.7 (continued)

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

* Control variable dropped due to lack of variation.

n.s. = not applicable.

TABLE D.8

ESTIMATED LOGIT COEFFICIENTS, SATISFACTION WITH OVERALL QUALITY OF CARE DURING FIRST SIX MONTHS

	AdminaStar		IFMC		Providence Hospital	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Intercept	.037	.99	3.221	.10	3.522	.56
Treatment/control status	.057	.85	.412	.10	-.667	.06
Number of physicians per 10,000 residents for county	-.016	.35	.007	.67	.018	.66
Number of nursing home beds per 100 elderly residents for county	.000	.80	.001	.24	.002	.88
Average Medicare reimbursement per enrollee (\$) for county	-.000	.84	-.000	.90	.000	.67
Age	.021	.38	-.021	.17	-.048	.06
Male	.396	.21	-.000	1.00	-.404	.25
White	.671	.13	*	n.a.	1.034	.01
Total Medicare reimbursement during year before reference date (\$10K)	.004	.80	-.013	.12	.015	.30
Original reason for Medicare eligibility was "old age"	.432	.30	*	n.a.	.059	.91
Number of secondary diagnoses associated with last hospitalization before reference date	.018	.85	-.043	.45	-.209	.12
Was last hospitalized between 31 and 183 days before reference date	*	n.a.	.631	.16	-.841	.14
Was last hospitalized more than 183 days before reference date	*	n.a.	*	n.a.	-.154	.87
Target diagnosis was chronic obstructive pulmonary disease	n.a.	n.a.	.023	.94	-.395	.61
Target diagnosis was stroke	n.a.	n.a.	n.a.	n.a.	-.051	.94
Target diagnosis was ischemic heart disease	n.a.	n.a.	n.a.	n.a.	-.499	.38
Target diagnosis was joint replacement	n.a.	n.a.	n.a.	n.a.	-.130	.85
Target disease was diabetes	n.a.	n.a.	n.a.	n.a.	-1.577	.13
Target disease was pneumonia or community referral	n.a.	n.a.	n.a.	n.a.	.369	.53
Target disease was miscellaneous disorder (other than chronic heart disease)	n.a.	n.a.	n.a.	n.a.	-1.310	.09
Number of Observations	659		646		382	

TABLE D.8 (continued)

SOURCE: Evaluation's six-month followup telephone survey fielded between May 1994 and November 1995.

* Control variable dropped due to lack of variation.

n.a. = not applicable.

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